

# VersaPro™ Packaged Heat Pump Service Manual

## MODELS:

- [MPH241H413B](#)
- [MPH301H413B](#)
- [MPH361H413B](#)
- [MPH421H413B](#)
- [MPH481H413B](#)
- [MPH601H413B](#)



Read this manual carefully before installation and keep it where the operator can easily find it for future reference.

Due to updates and constantly improving performance, the information and instructions within this manual are subject to change without notice.

Version Date: 05/16/24  
Please visit [www.mrcool.com/documentation](http://www.mrcool.com/documentation)  
to ensure you have the latest version of this manual.

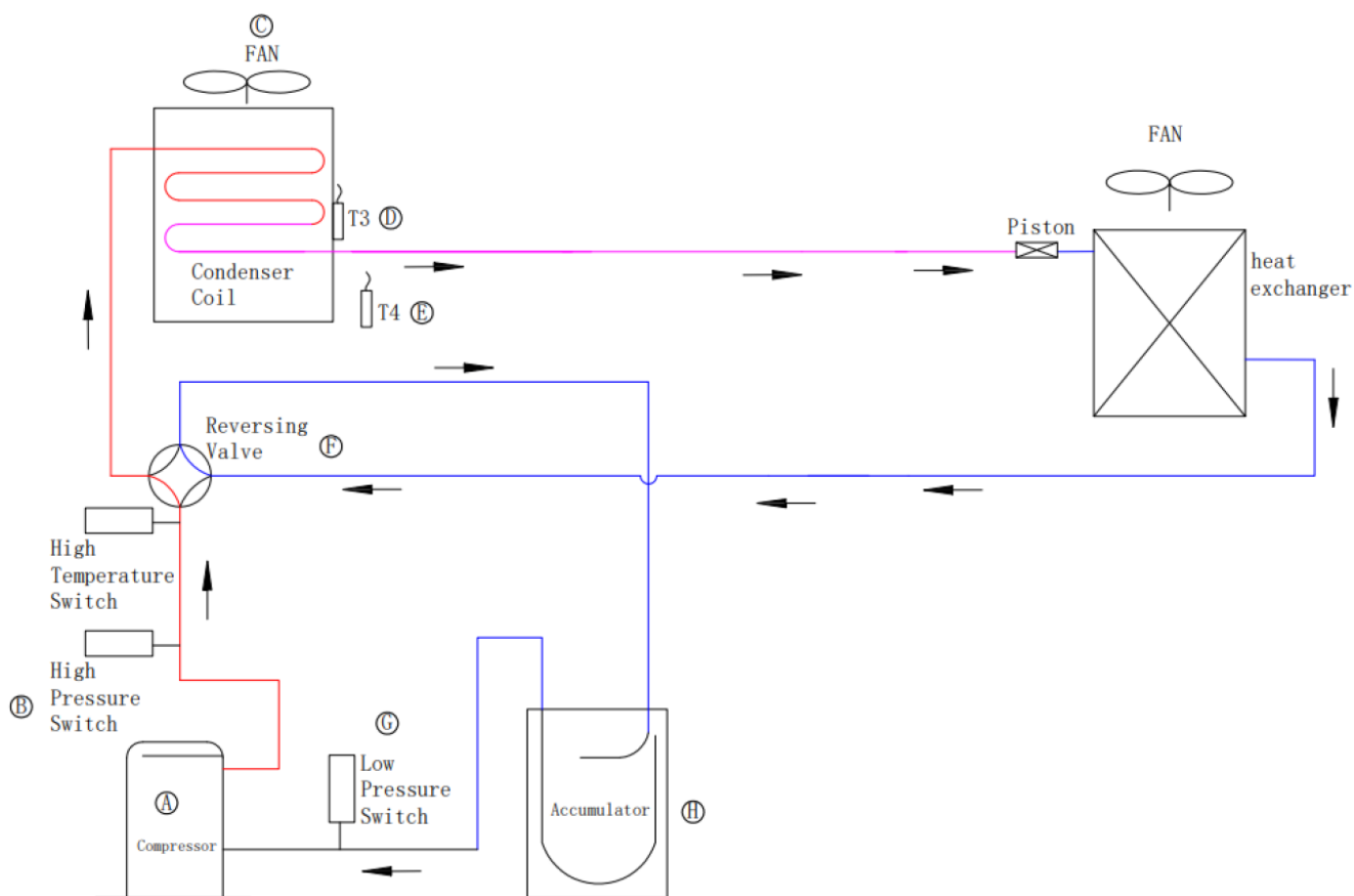


# CONTENTS

<b>1</b>	<b>REFRIGERATION</b> .....	2
	1.1 Refrigeration Circuit .....	2
	1.2 Functional Parts .....	3
	1.3 Refrigerant Flow Chart .....	5
<b>2</b>	<b>FUNCTION &amp; CONTROL</b> .....	6
	2.1 General Function .....	6
	2.2 Unit Shutdown Control .....	7
	2.3 Unit Standby Control .....	7
	2.4 Reversing Valve Control .....	7
	2.5 Fan Control .....	8
	2.6 PEV Control .....	8
	2.7 Defrost Control .....	9
	2.8 Unit Protection Control .....	9
	2.9 Fault of Main Board .....	10
	2.10 Unit Fault Control or Restart .....	11
<b>3</b>	<b>FIELD SETTINGS</b> .....	13
	3.1 Pre-Test Checks .....	13
	3.2 Turning Power On .....	13
	3.3 Charging Refrigerant .....	14
	3.4 Manual Defrost .....	14
	3.5 Dip Switch Setting .....	15
	3.6 LED Position Indication .....	16
<b>4</b>	<b>TROUBLESHOOTING</b> .....	17
	4.1 System Diagnosis Introduction .....	17
	4.2 Symptom-Based Troubleshooting .....	19
	4.3 Main Board Fault Code Troubleshooting .....	22
<b>5</b>	<b>SYSTEM CHECKS</b> .....	30
	5.1 High Pressure Rise .....	30
	5.2 Low Pressure Drop-Cooling .....	31
	5.3 Low Pressure Drop-Heating .....	32
	5.4 Blocked Refrigeration Cycling .....	33
	5.5 Control Board .....	34
	5.6 Temperature Sensor (T3/T4) .....	35
	5.7 High Pressure Switch (HPS) .....	36
	5.8 Low Pressure Switch (LPS) .....	37
	5.9 Discharge Temperature Switch (T5) .....	38
	5.10 Condenser Fan Motor .....	39
<b>6</b>	<b>APPENDIX</b> .....	41
	6.1 Wiring Diagrams .....	41
	6.2 Control Board Replacement Procedure .....	45
	6.3 Fault Codes of Motor Driver & Main Control Modules .....	46
	6.4 Troubleshooting Guide .....	47
	6.5 Temperature & Resistance Relationship Tables .....	48

## 1.1 Refrigeration Circuit

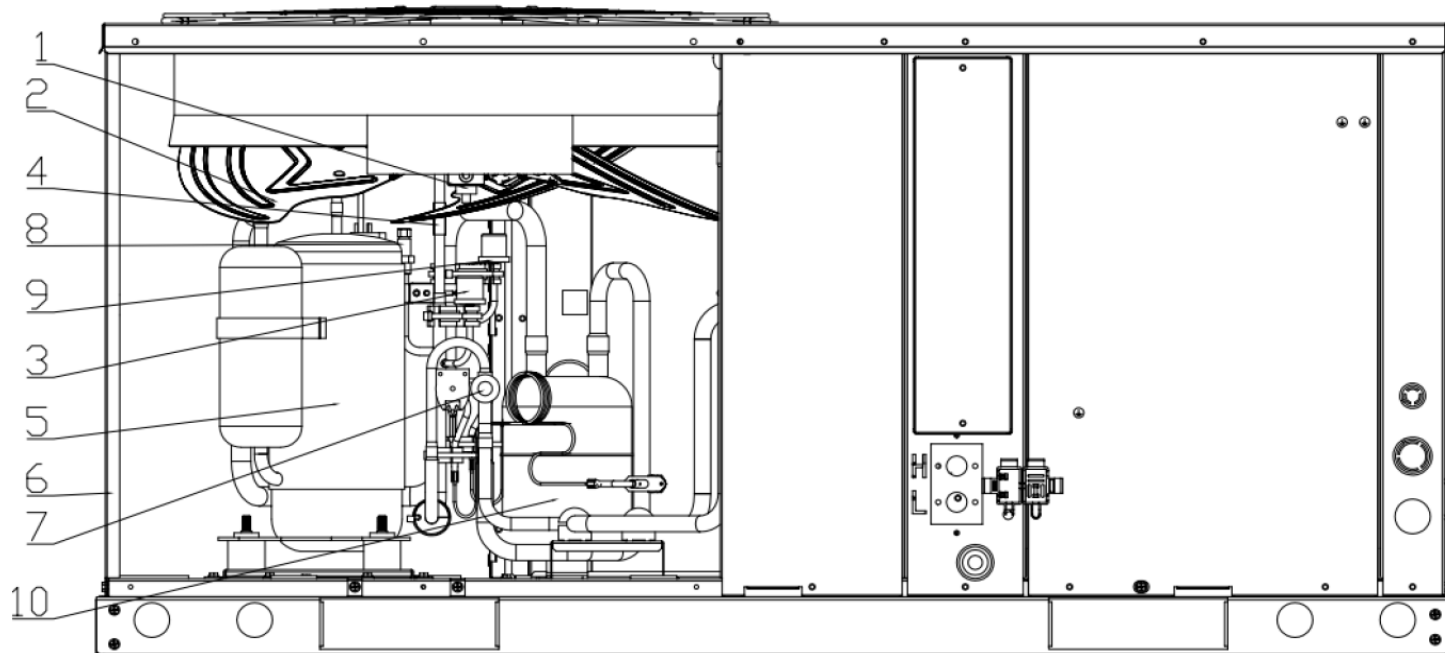
Letter	Symbol	Part Name	Major Function
A	Comp.	Compressor	Compresses & drives the refrigerant
B	HPS	High pressure switch	Used for high pressure protection up to 609 PSIG and recovery when below 464 PSIG
C	Fan	Fan of outdoor	Used to help heat exchange by 10-speed PSC motor
D	T3	Condenser coil temperature sensor	Used to discharge temperature protection and fan control in cooling mode, and defrost control
E	T4	Ambient temperature sensor	Used for ambient protection and fan control in cooling mode, and defrost control
F	RV	Reversing Valve	Used to switch mode between cooling and heating
G	LPS	Low pressure switch	Used for low pressure protection when below 20 PSIG and recovery up to 44 PSIG
H	Accumulator	Accumulator	Stores the liquid component of the refrigerant and reduces the load of the condenser



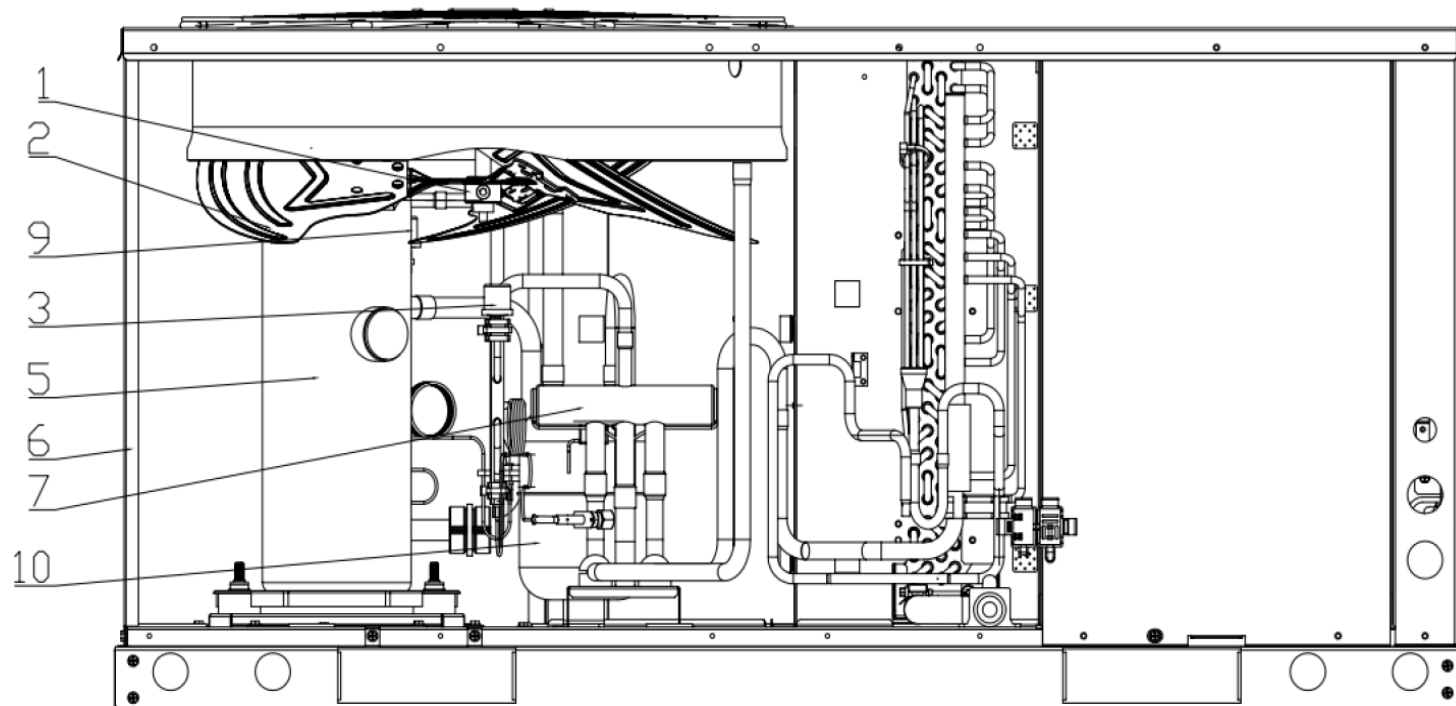
# 1 REFRIGERATION

## 1.2 Functional Parts

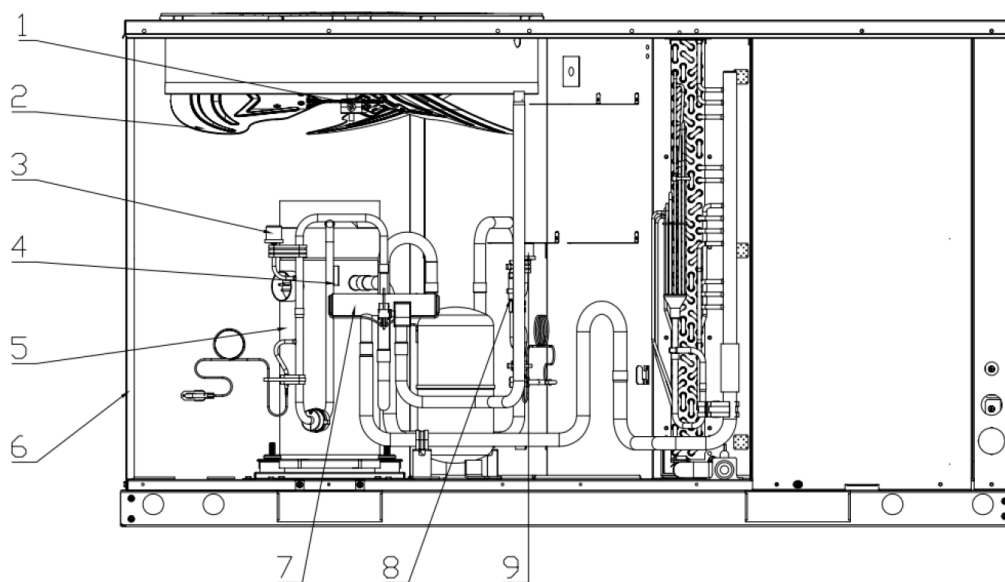
### 13.4H 71/90



### 13.4H 105

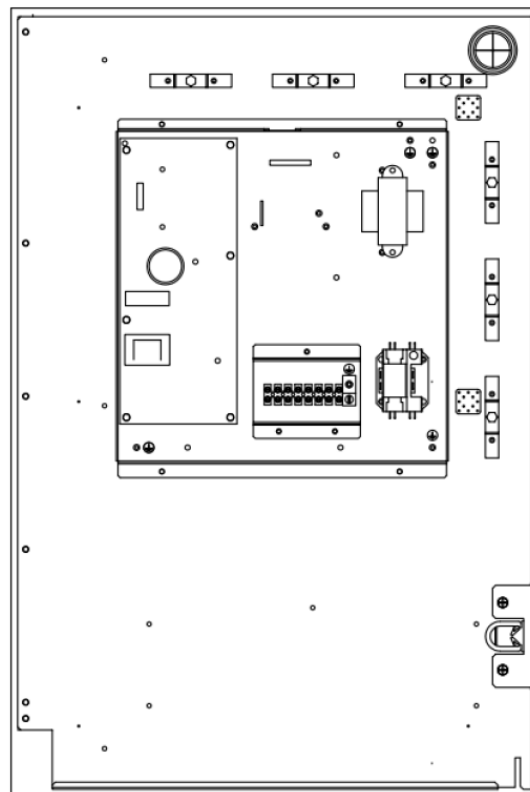


## 13.4H 120/140/160



#	Symbol	Part Name
1	Motor	Fan motor
2	Fan	Outdoor fan
3	HPS	High pressure switch
4	DTS	Discharge temperature switch
5	Comp.	Compressor
6	Coil	Condenser Coil
7	RV	Reversing Valve
8	FPA	Fusible Plug Assembly
9	PS	Pressure Switch
10	Accum.	Accumulator

### Electric Control Box for 71/90/105/120/140/160

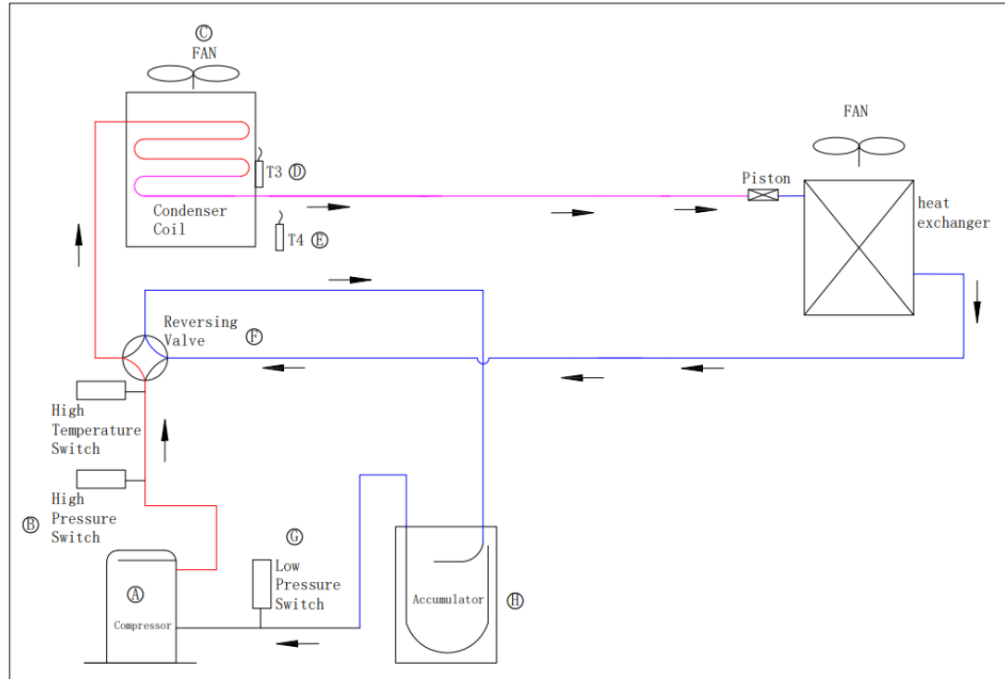


# 1 REFRIGERATION

## 1.3 Refrigerant Flow Chart

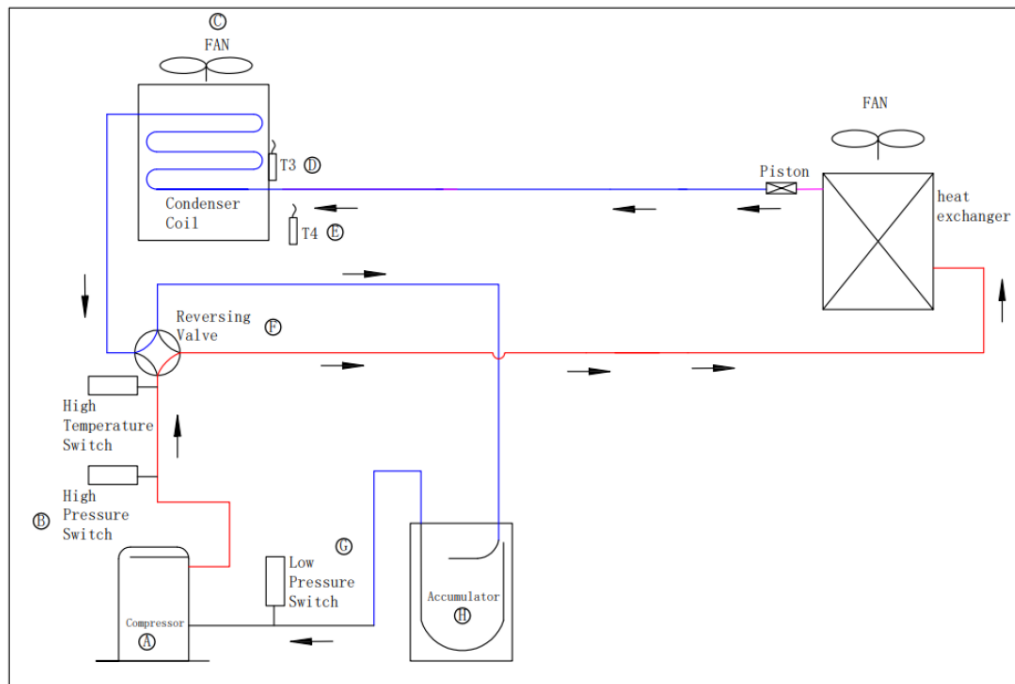
Cooling Operation/Cooling Oil Return Operation/Defrost Operation

- High pressure gas
- High pressure liquid
- Low pressure

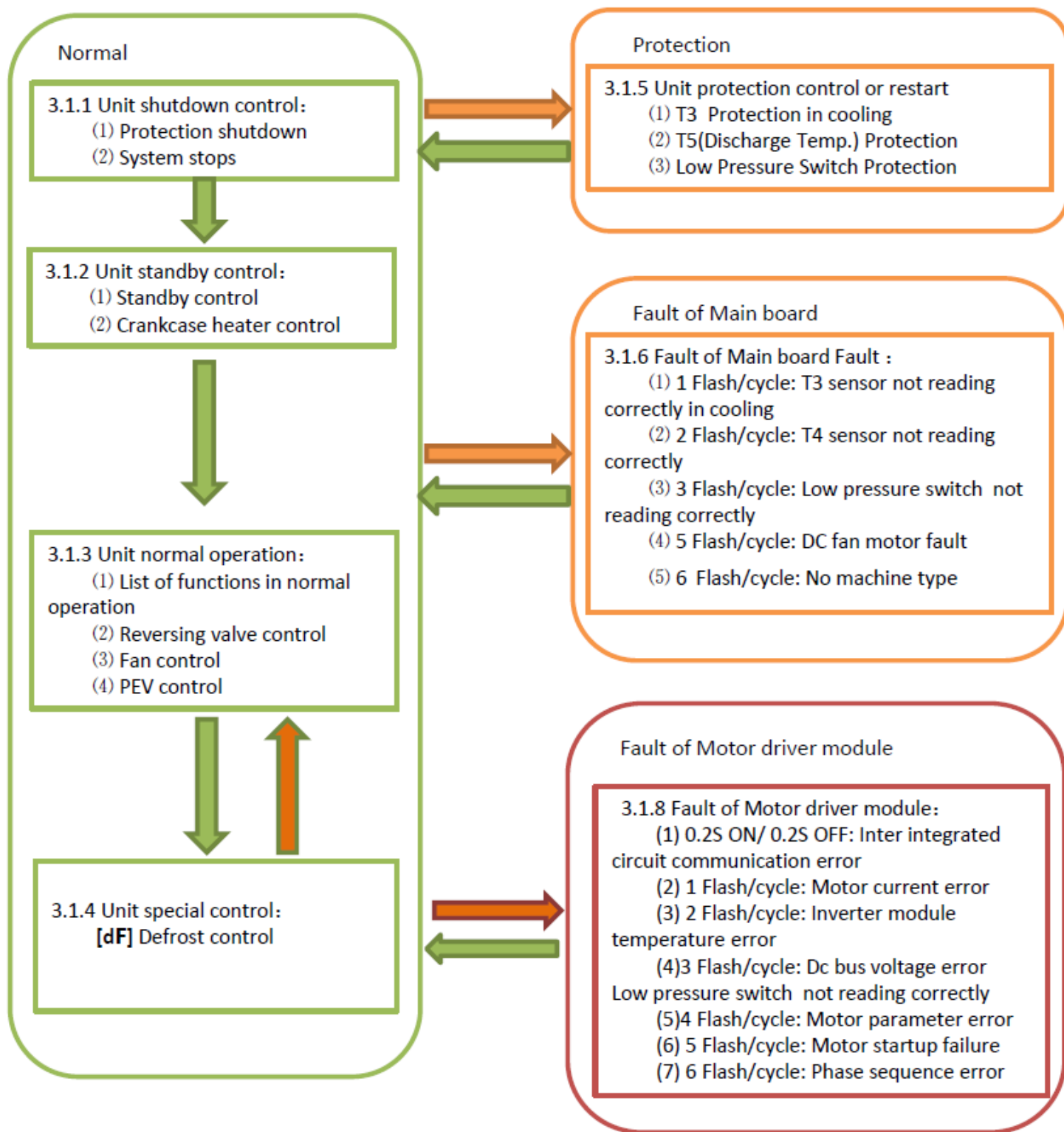


Heating Operation/Heating Oil Return Operation

- High pressure gas
- High pressure liquid
- Low pressure



## 2.1 General Function



## 2 FUNCTION & CONTROL

### 2.2 Unit Shutdown Control

#### 1. Unit Protection Shutdown

To protect the outdoor unit, the system will shut down when an abnormality occurs. The LED 1 (Red) or LED 2 (Green) will also show the fault code when a fault is present.

#### 2. Thermostat Satisfied Shutdown

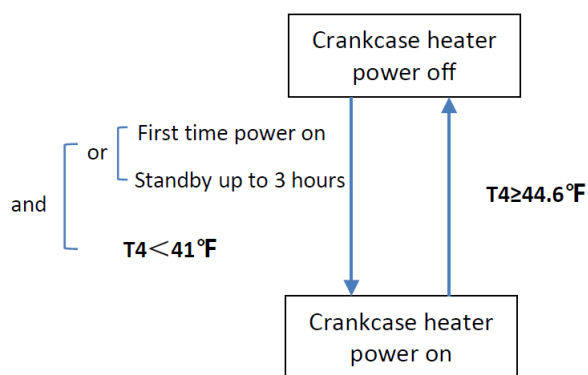
Anytime system is in unit standby, LED 1 (Red) will flash slowly (2 seconds on, and 2 seconds off).

### 2.3 Unit Standby Control

#### 1. Standby Control

When compressor stops, the outdoor fan stops immediately. Before the compressor starts, the outdoor fan motor will run at least 15 seconds.

#### 2. Crankcase Heater Control



T4 = Ambient temperature

### 2.4 Reversing Valve Control

Anytime the compressor is operating, the digital tube will show the frequency of the compressor.

#### Cooling:

Symbol	Part Name	Major Function
RV	Reversing Valve	OFF
Fan	Outdoor Fan Motor	10 speed ECM motor; controlled by T3

#### Heating:

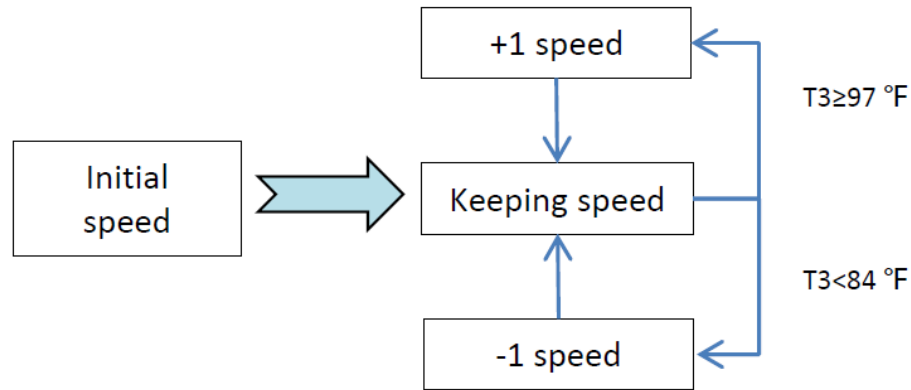
Symbol	Part Name	Major Function
RV	Reversing Valve	ON
Fan	Outdoor Fan Motor	10 speed ECM motor; controlled by T3

- The heat pump requires the "B" signal of 24V wires.
- COOLING:** The reversing valve is OFF during cooling.
- HEATING:** -The reversing valve is ON during heating and heating standby.  
-The reversing valve will delay about 1 minute when first starting for reversing reliability.



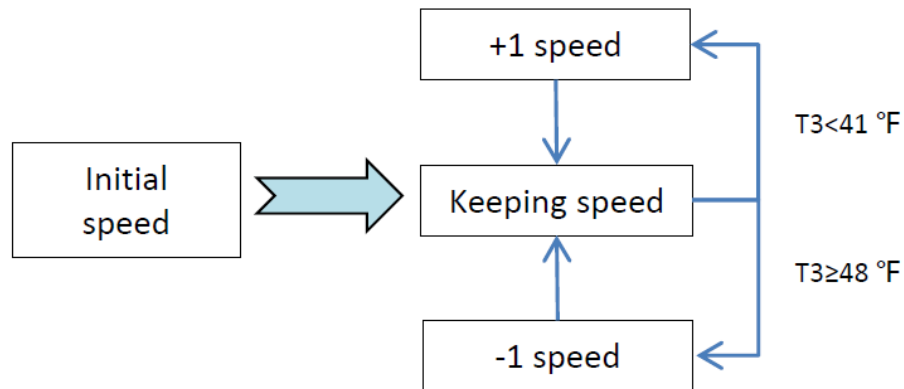
## 2.5 Fan Control

[Cooling]



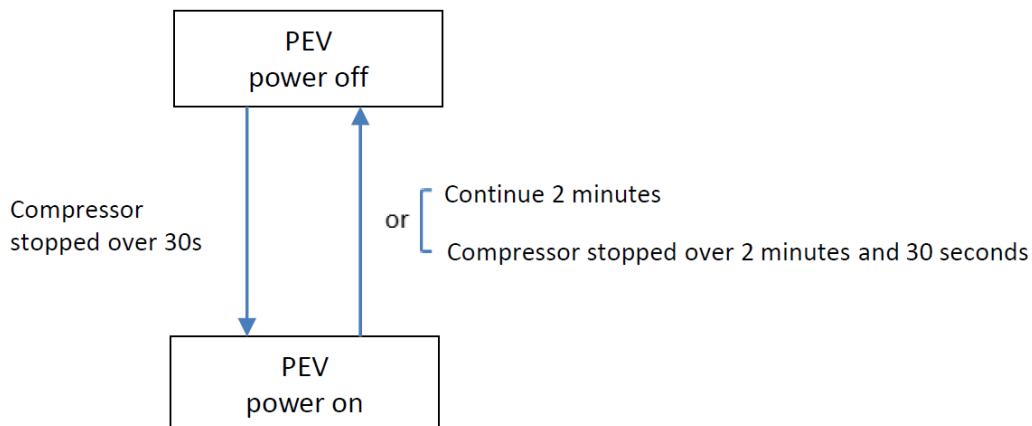
Note:  $\pm 1$  speed/25 seconds, 10 speeds ECM motor.

[Heating]



## 2.6 PEV Control

The PEV's function is to help equalize the refrigerant pressure on the high and low sides prior to operation of the compressor. A hissing sound will occur every time after the compressor stops; this is the PEV equalizing the pressure.



## 2 FUNCTION & CONTROL

### 2.7 Defrost Control

The Demand Defrost Control (DDC) monitors the coil temperature using the thermistor (T3). A second thermistor (T4) monitors ambient temperature.

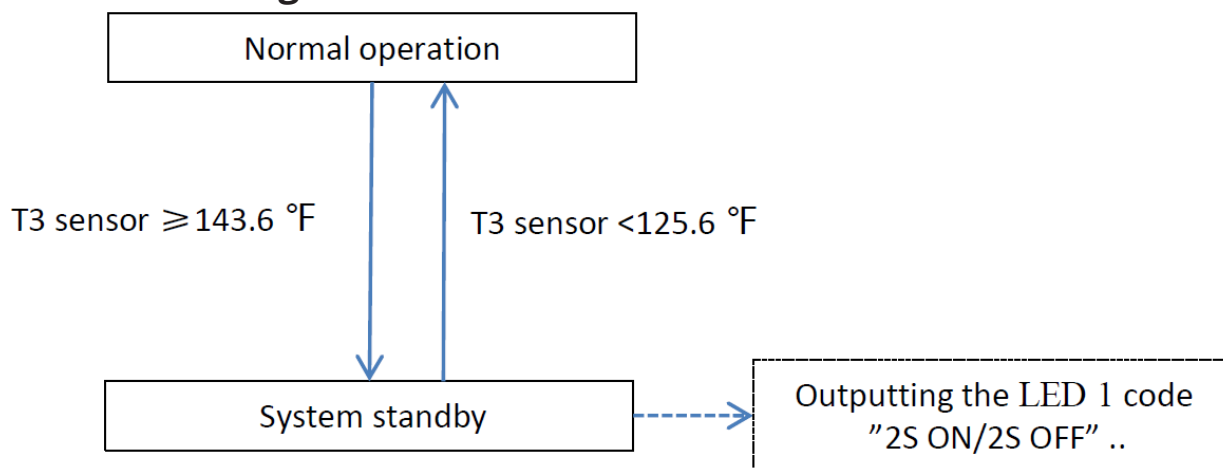
Based on these parameters, as well as accumulative running time and standby time, the DDC calculates proper initiation of defrost.

Any of three conditions is required for defrosting to occur:

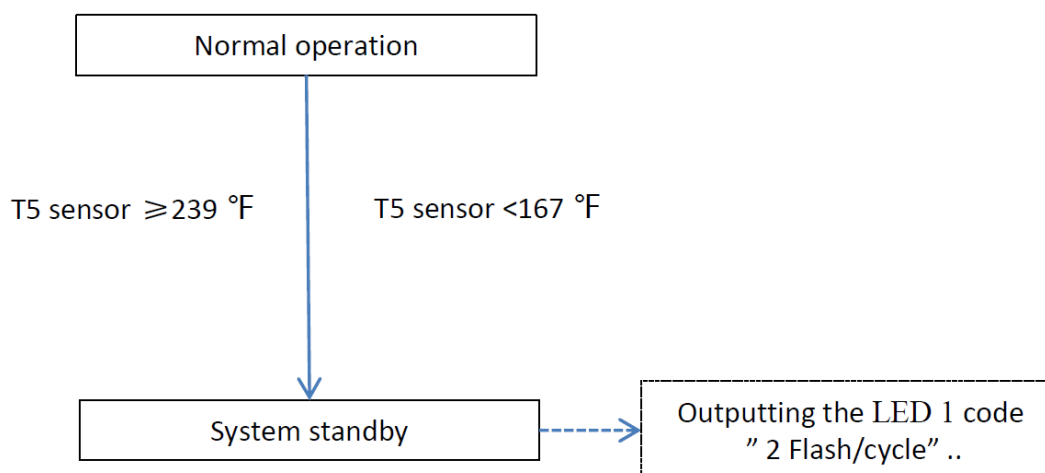
- $T3 < 32^{\circ}\text{F}$  ( $0^{\circ}\text{C}$ ) and lasts for 60 minutes.
- $T4 < 32^{\circ}\text{F}$  ( $3^{\circ}\text{C}$ ) and lasts for 65 minutes.
- "Standby time" is 2 hours,  $T3 < 28^{\circ}\text{F}$  ( $-2^{\circ}\text{C}$ ) when starting and lasts for 15 minutes.

### 2.8 Unit Protection Control

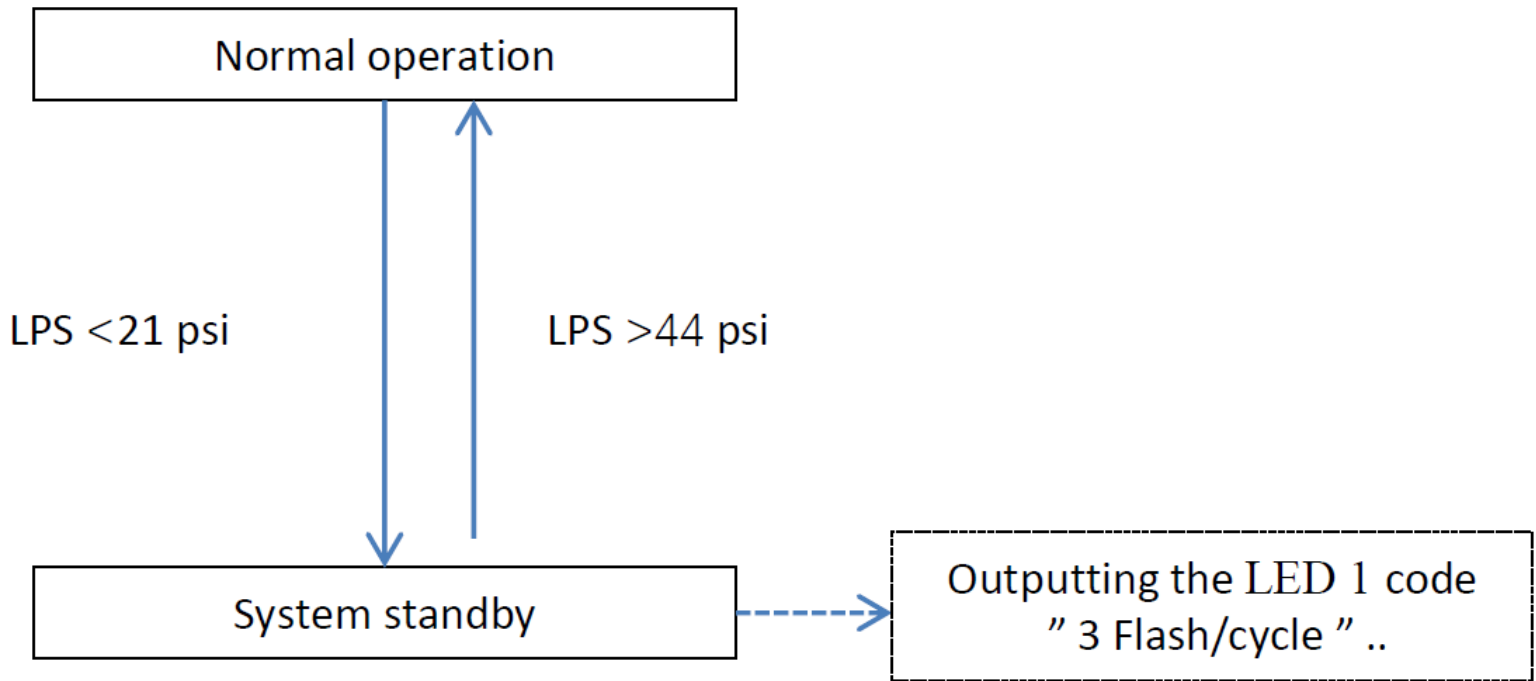
#### T3 Protection in Cooling



#### T5 (Discharge Temperature) Protection



### Low Pressure Switch Protection

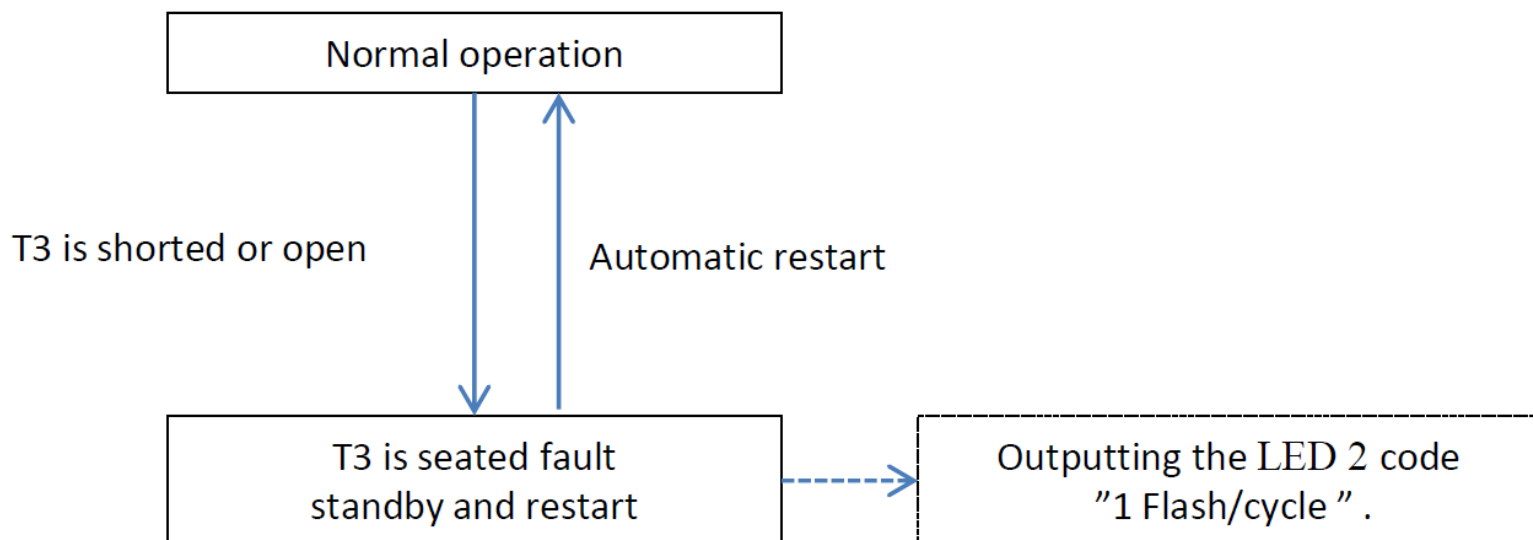


### 2.9 Fault of Main Board

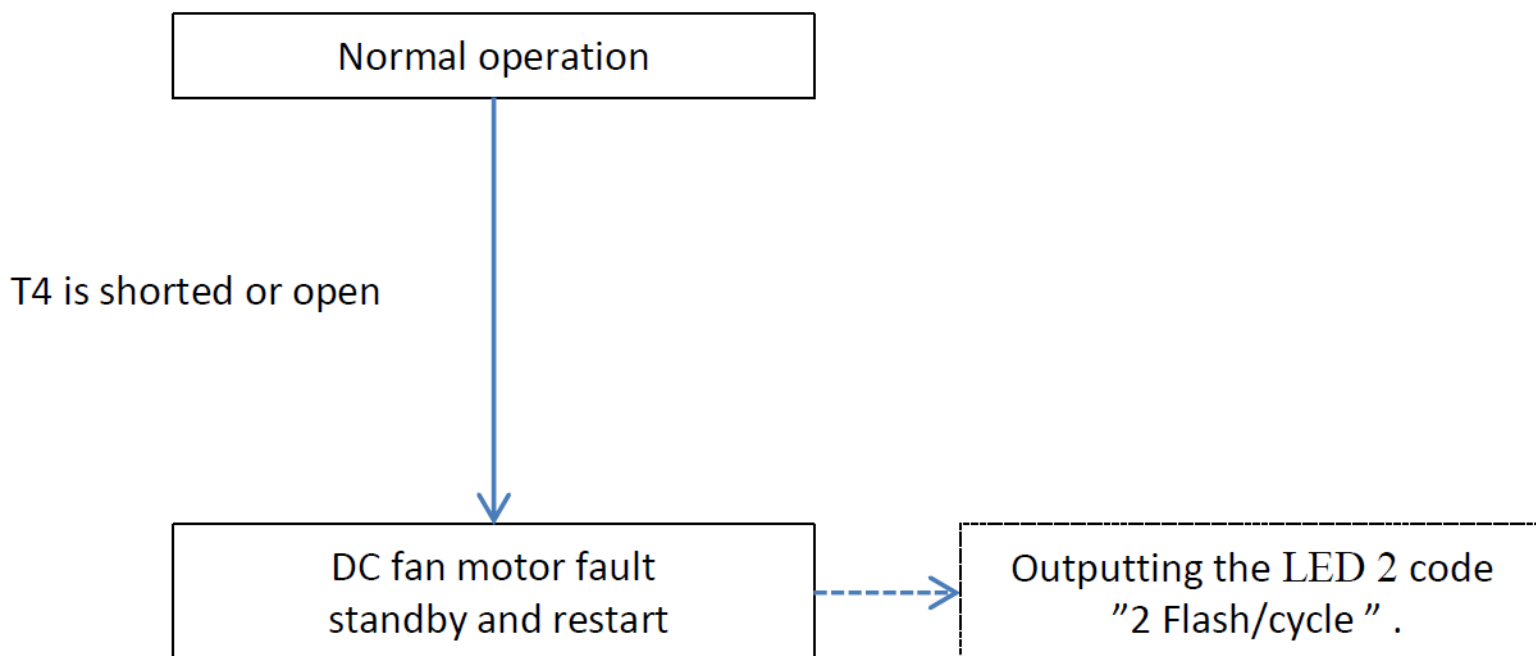
No.	Operation LED	Protection Code	Protection Control Description	Supposed Cause
1	LED2	1 Flash/Cycle	T3 Sensor not reading correctly in cooling	T3 sensor is not properly placed/High pressure switch fault
2	LED2	2 Flash/Cycle	T4 Sensor not reading correctly	T4 sensor is not properly placed/High pressure switch fault/Discharge temperature switch open
3	LED2	3 Flash/Cycle	Low pressure switch not reading correctly	Low pressure switch is not properly connected
4	LED2	5 Flash/Cycle	DC fan motor fault	Motor fault/severe weather (fan rpm too low due to wind)
5	LED2	6 Flash/Cycle	Phase sequence error	Speed message isn't in main board

### 2.10 Unit Fault Control or Restart:

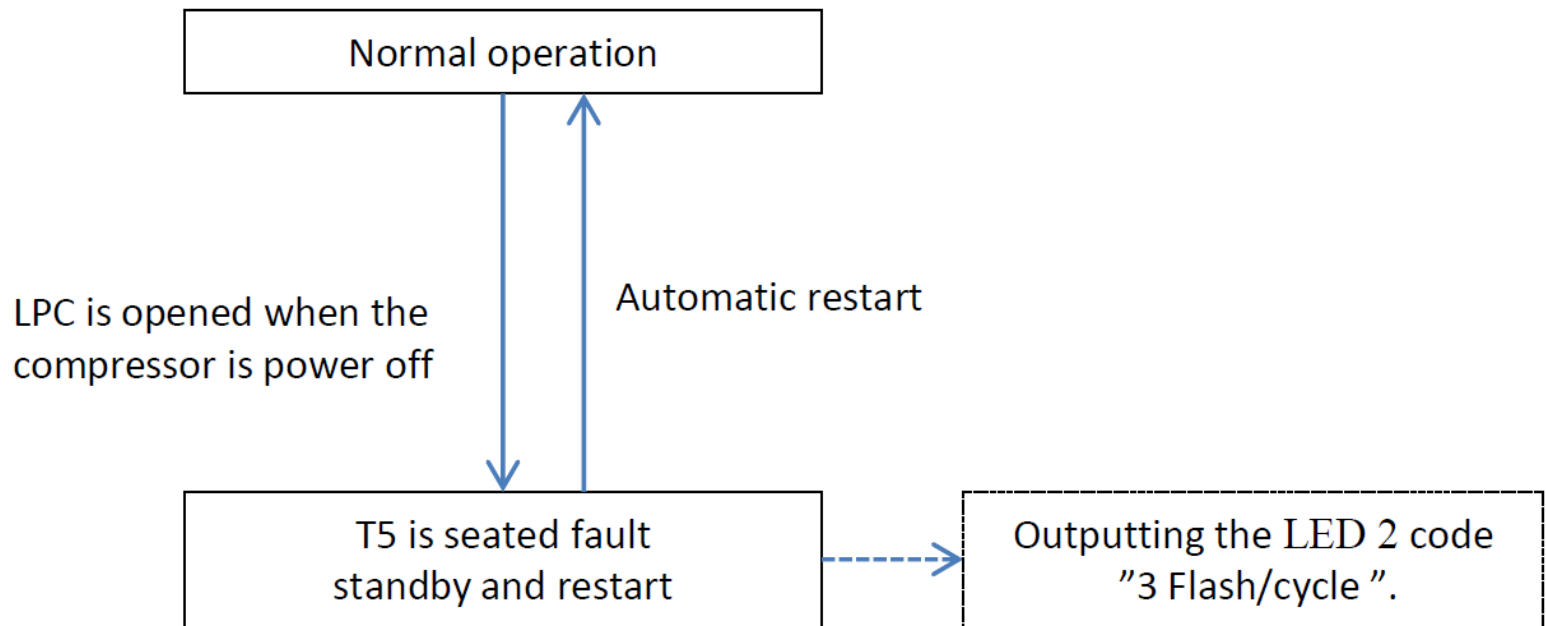
#### T3 Sensor Not Reading Correctly in Cooling



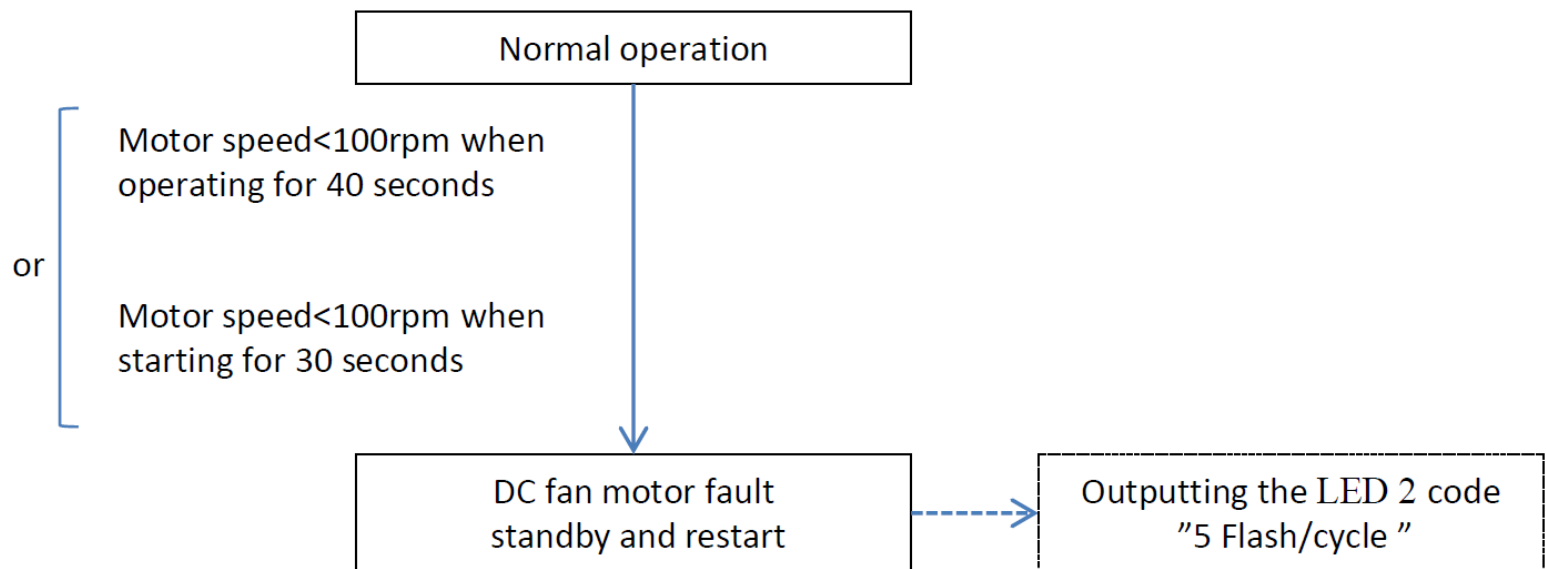
#### T4 Sensor Not Reading Correctly



### LPC Open



### OFAN Failure

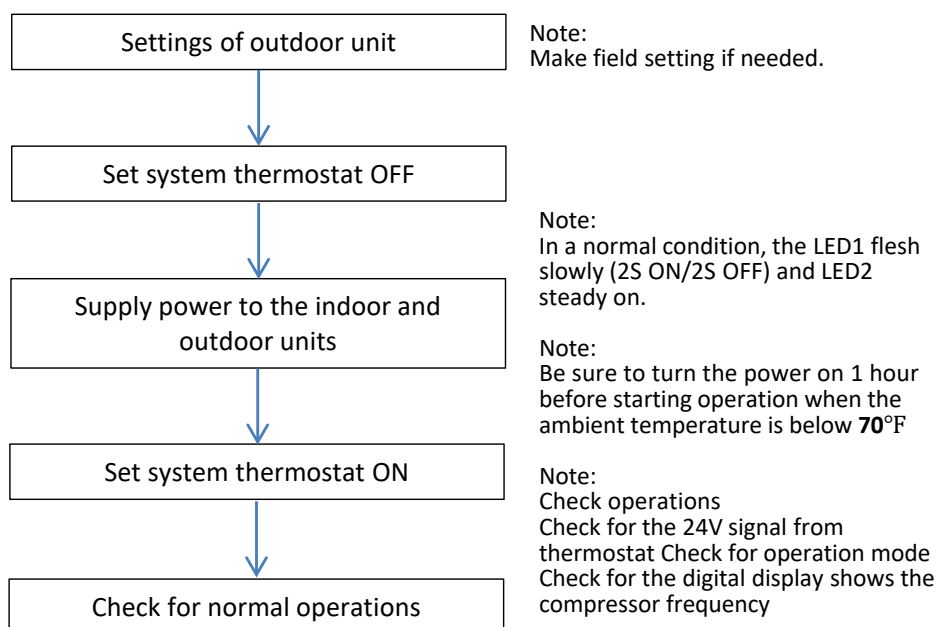


# 3 FIELD SETTINGS

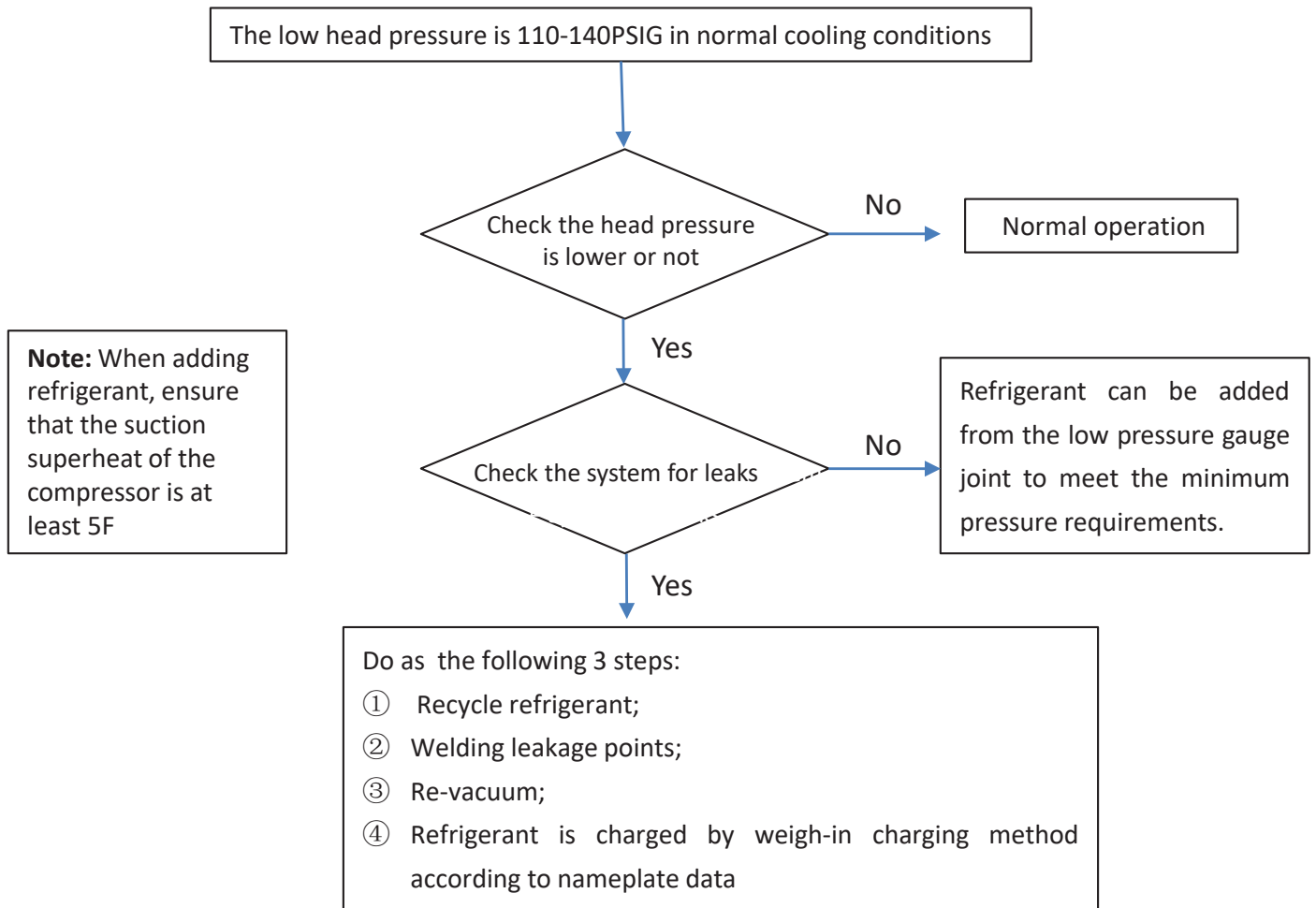
## 3.1 Pre-Test Checks

No.	Checkpoints	Cautions or Warnings
1	Are all units securely installed?	Possibility of damage to pipe connections and unit turnover
2	Is the grounding wire installed according to the applicable local standard?	Dangerous if electrical leakage occurs
3	Is the condenser unit installed according to the location requirements?	Poor capacity; abnormal operation
4	Are all air inlets and outlets of the indoor and outdoor units unobstructed?	Poor cooling; poor heating
5	Does the drain flow out smoothly?	Pipeline water leak
6	Is piping adequately heat-insulated?	Pipeline water leak; poor capacity
7	Are the power supply wirings (including the grounding wire) connected normally?	Dangerous if electrical leakage occurs
8	Is the earth leakage circuit breaker connected normally?	Dangerous if electrical leakage occurs
9	Are the 24V signal wirings connected according to the wiring diagram? (Including the thermostat wiring and setting)	Abnormal operation
10	Does the supply voltage conform to the specifications on the name plate?	Abnormal operation; damage of unit
11	Are all sizes of cables as specified according to local regulations?	Damage of cables

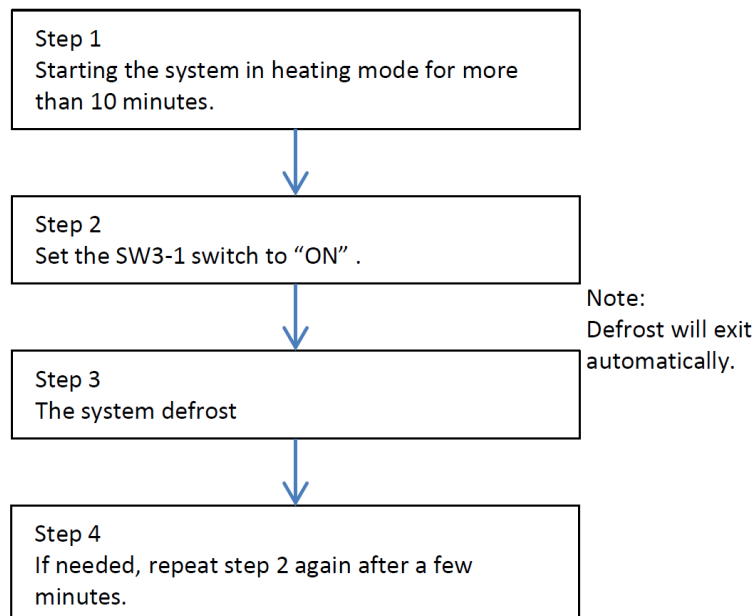
## 3.2 Turning Power On



## 3.3 Charging Refrigerant

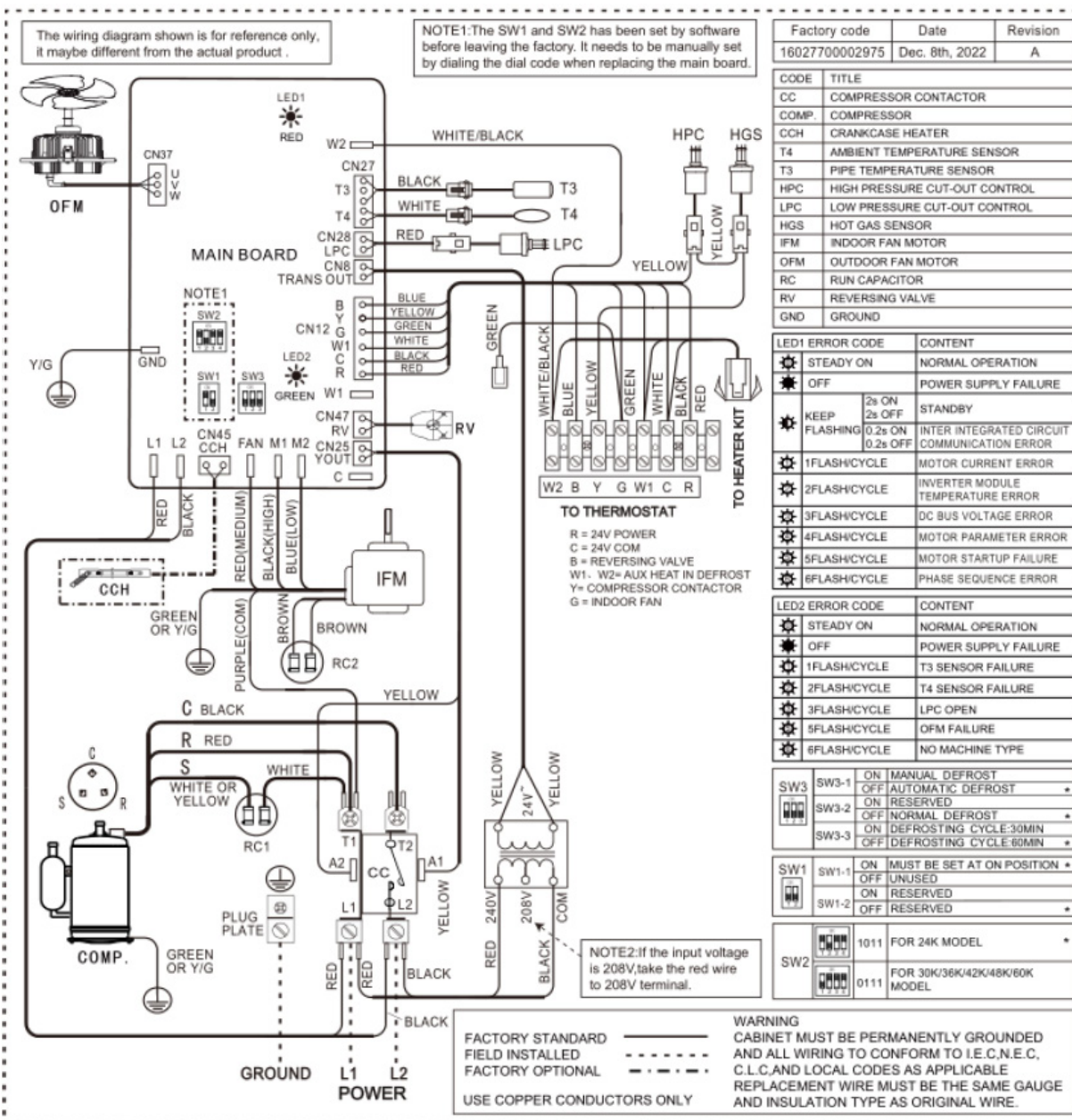


## 3.4 Manual Defrost



# 3 FIELD SETTINGS

## 3.5 Dip Switch Settings



SW3	SW3-1	ON	MANUAL DEFROST	
		OFF	AUTOMATIC DEFROST	*
	SW3-2	ON	RESERVED	
		OFF	NORMAL DEFROST	*
	SW3-3	ON	DEFROSTING CYCLE:30MIN	
		OFF	DEFROSTING CYCLE:60MIN	*
SW1	SW1-1	ON	MUST BE SET AT ON POSITION	*
		OFF	UNUSED	
	SW1-2	ON	RESERVED	
		OFF	RESERVED	*
SW2	SW2-1	ON	FOR 24K MODEL	*
		OFF	FOR 30K/36K/42K/48K/60K MODEL	



## 3.6 LED Position Indication

### 3.6.1 LED1/LED2 OFF

Issue	LED1/LED2 OFF
Model	All
Fault name	/
Classify	Power/electric issue
Possible cause	<ul style="list-style-type: none"> <li>• Frequently power off and power on (within 3 minutes)</li> <li>• Abnormal power input</li> <li>• Abnormal wire connections</li> </ul>
Notes:	



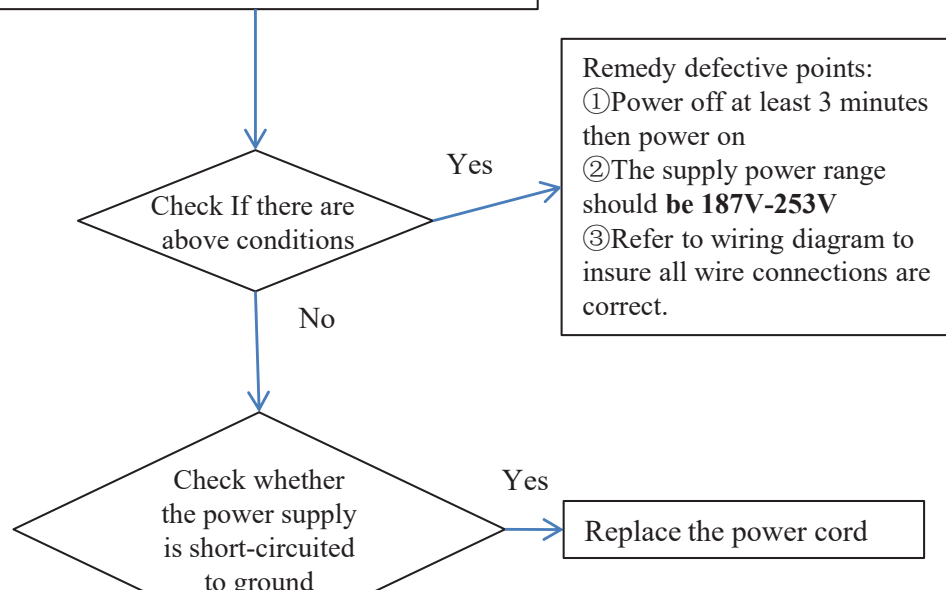
Check for the following 4 points:

- ① If frequently power off and power on (within 3 minutes)
- ② If the supply power is normal
- ③ If wiring diagram to insure all wire

Note:

- ① to ①
- ② to ②

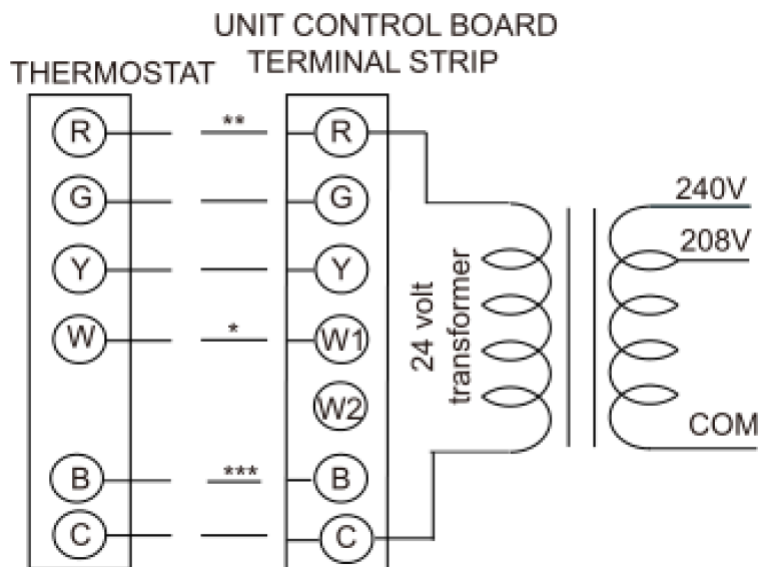
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# 4 TROUBLESHOOTING

## 3.7 Thermostat

The thermostat should be mounted on an inside wall about 58" (1.6 yd) from the floor and should not be affected by unconditioned air, sun, and/or heat exposure. Follow the instructions carefully as there are many wiring requirements.



\* Only required on units with supplemental electric heat.

\*\* Minimum wire size of 18 AWG wire should be used for all field-installed 24 volt wire.

\*\*\* The B wire should be used with a heat pump system only. The reversing valve energizes in heating mode and cuts off in cooling mode.

## 4.1 System Diagnosis Introduction

There are two types of auxiliary diagnostic codes in the system: main board codes and motor driver module codes.

### Fault of Main Board

No.	LED Operation	Protection Code	Protection Control Description	Supposed Cause
1	LED2	1 Flash/Cycle	T3 sensor not reading correctly in cooling	T3 sensor is not properly placed; high pressure switch fault
2	LED2	2 Flash/Cycle	T4 sensor not reading correctly	T4 sensor is not properly placed; high pressure switch fault; discharge temp. switch open
3	LED2	3 Flash/Cycle	Low pressure switch not reading correctly	Low pressure switch is not properly connected
4	LED2	5 Flash/Cycle	DC fan motor fault	Motor fault; severe weather (fan rpm too low due to wind)
5	LED2	6 Flash/Cycle	No machine type	No speed message in main board

### Fault of Motor Driver Module

No.	LED Operation	Protection Code	Protection Control Description	Supposed Cause
1	LED1	0.2s ON / .025s OFF	Integrated circuit communication error	Main board is broken
2	LED1	1 Flash/Cycle	Motor current error	Motor shaft is stuck or motor is broken
3	LED1	2 Flash/Cycle	Inverter module temp. error	Motor is broken
4	LED1	3 Flash/Cycle	DC bus voltage error	Check the power supply
5	LED1	4 Flash/Cycle	Motor parameter error	Main board is broken or motor type is wrong
6	LED1	5 Flash/Cycle	Motor startup failure	Check the motor
7	LED1	6 Flash/Cycle	Phase sequence error	Check the motor supply wiring

- These fault codes will be displayed until the issue is resolved.

# 4 TROUBLESHOOTING

## 4.2 Symptom-Based Troubleshooting

### LED1/LED2 OFF

<b>Issue</b>	LED1/LED2 Off
<b>Model</b>	All
<b>Fault Name</b>	/
<b>Classification</b>	Power/Electric Issue
<b>Possible Cause</b>	<ul style="list-style-type: none"> <li>Frequently powers off and on (within 3 minutes)</li> <li>Abnormal power input</li> <li>Abnormal wire connections</li> </ul>

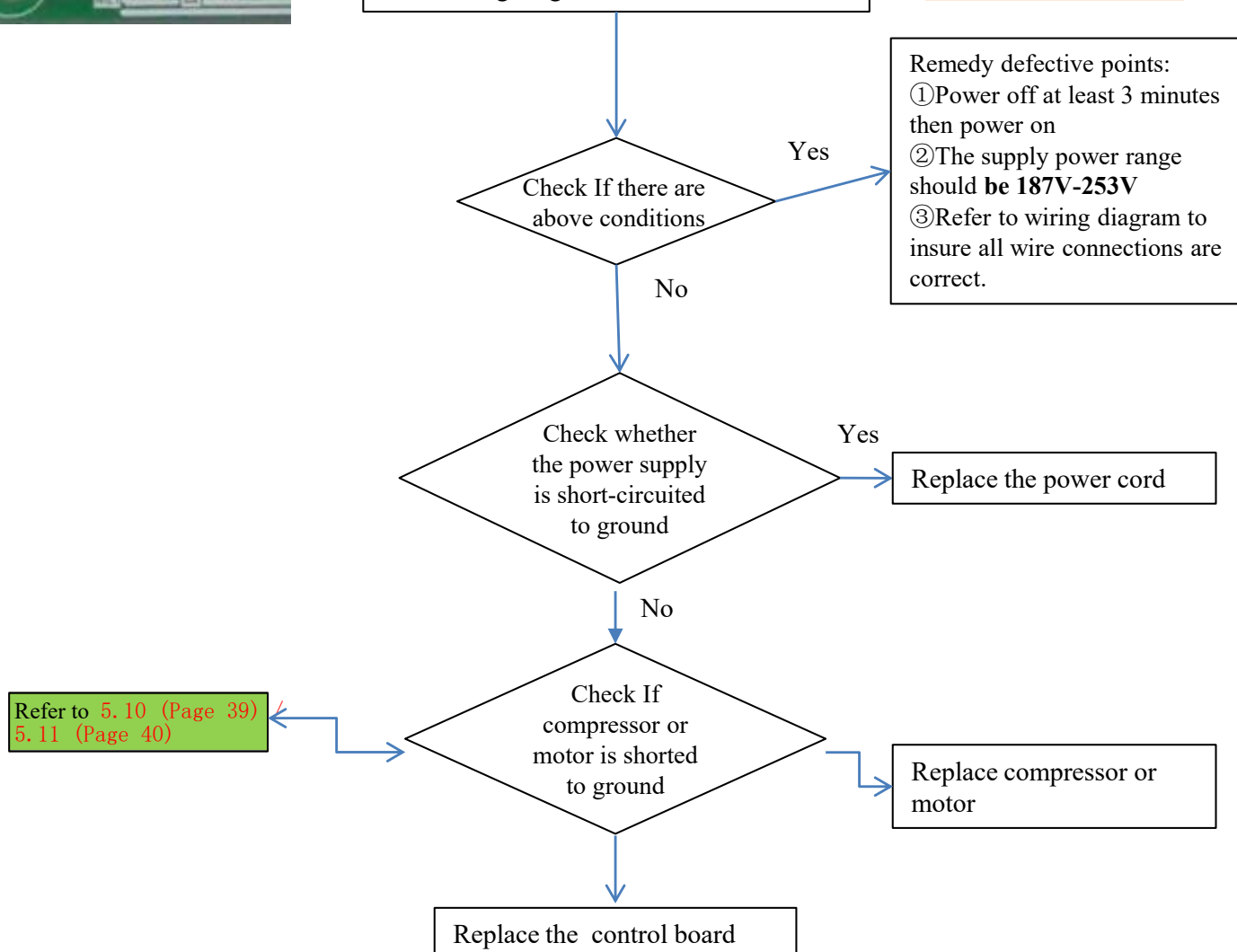


Check for the following 4 points:  
 ① If frequently power off and power on (within 3 minutes)  
 ② If the supply power is normal  
 ③ If wiring diagram to insure all wire

**Note:**

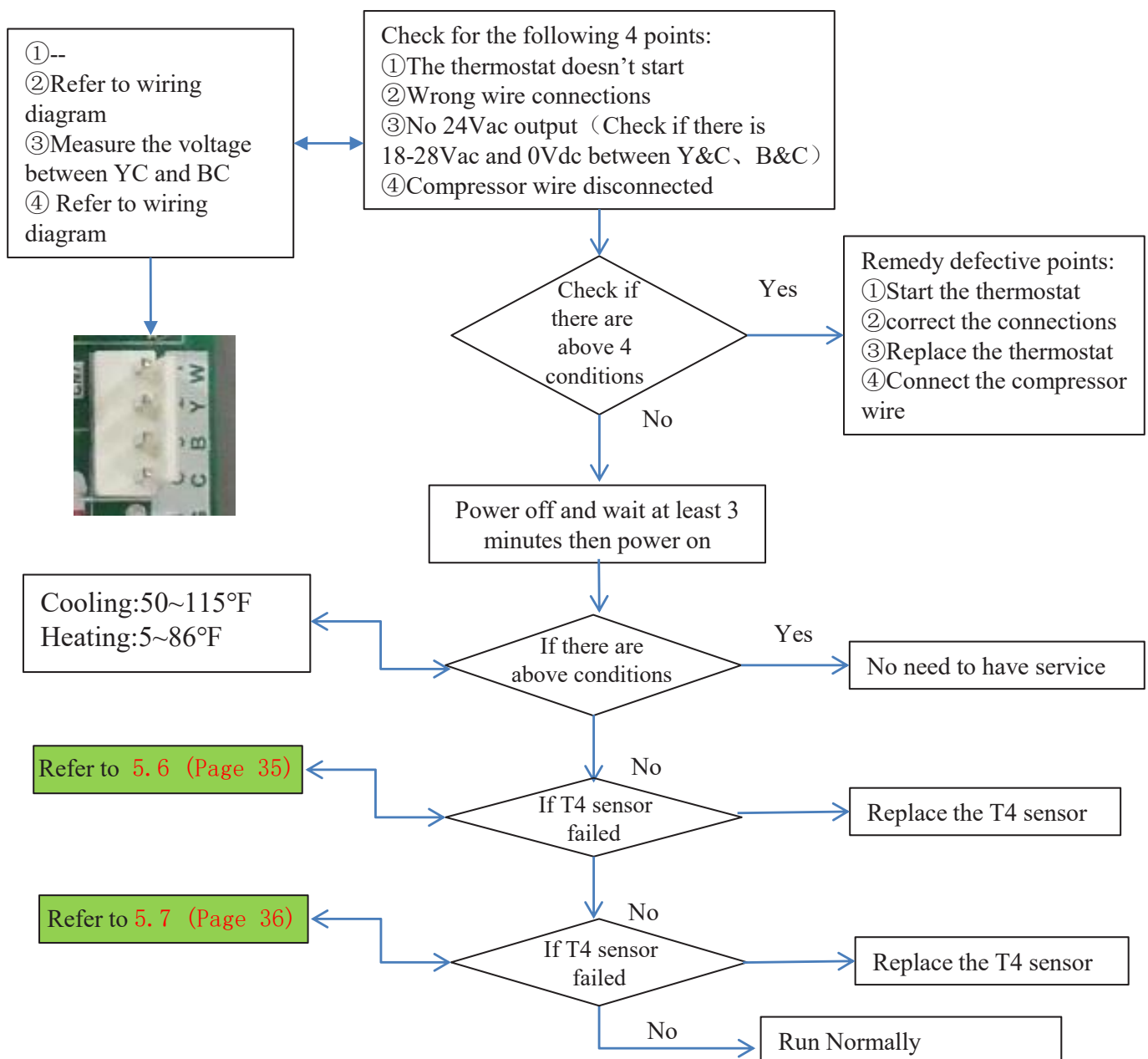
① to ①  
 ② to ②  
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The same below



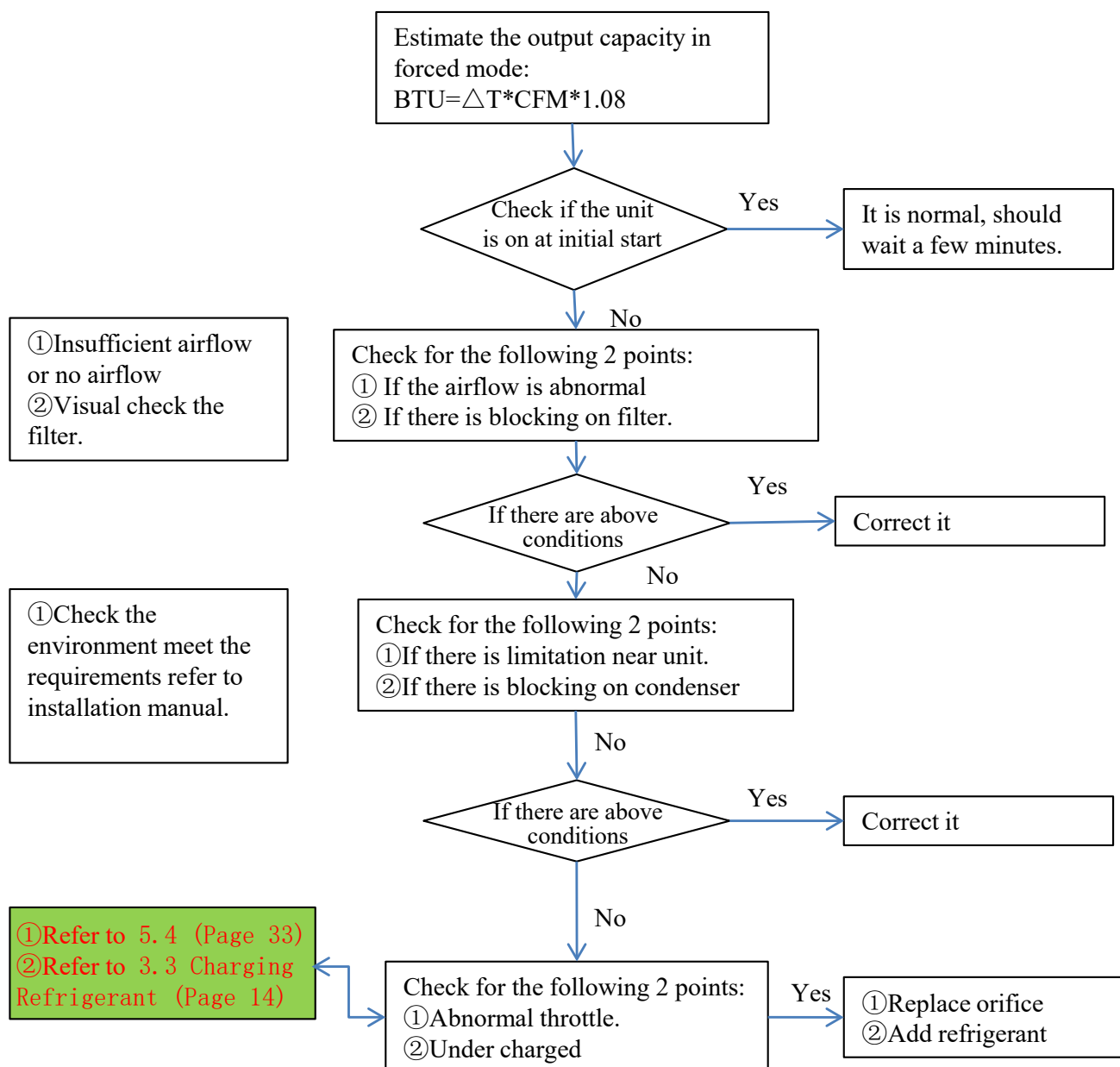
## System Does Not Start Operation

<b>Issue</b>	System does not start operation
<b>Model</b>	All
<b>Fault Name</b>	/
<b>Classification</b>	Thermostat Fault
<b>Possible Cause</b>	<ul style="list-style-type: none"> <li>Thermostat doesn't start</li> <li>Incorrect wiring between thermostat and unit</li> <li>Damaged thermostat</li> <li>Disconnected compressor wire (could occur after service)</li> </ul>



## Capacity is Low

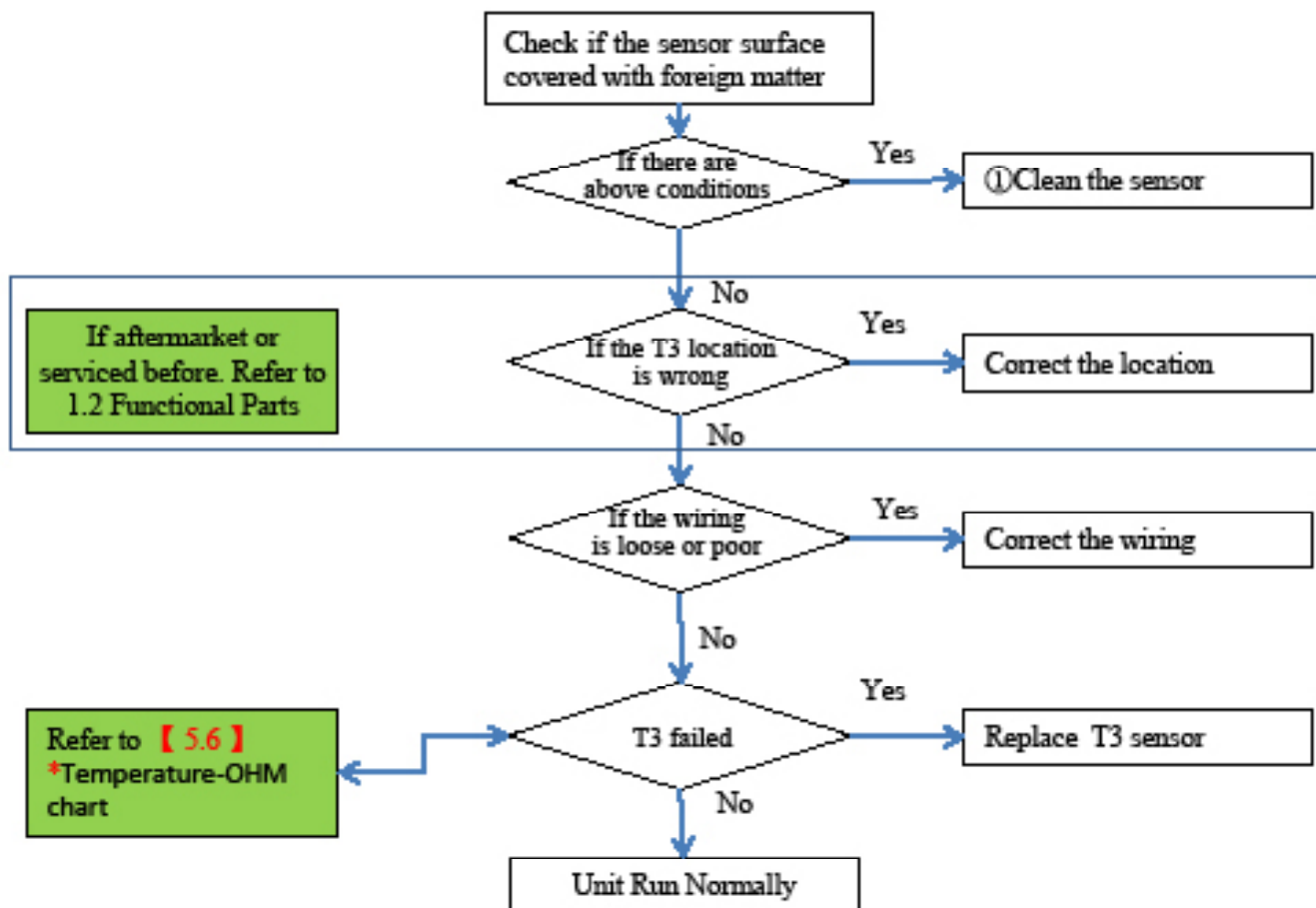
<b>Issue</b>	Capacity is low
<b>Model</b>	All
<b>Fault Name</b>	/
<b>Classification</b>	System Fault
<b>Possible Cause</b>	<ul style="list-style-type: none"> <li>• Poor heat dissipation of the evaporator</li> <li>• Poor heat dissipation of the condenser</li> <li>• Undercharged</li> <li>• First start</li> </ul>



## 4.3 Main Board Fault Code Troubleshooting

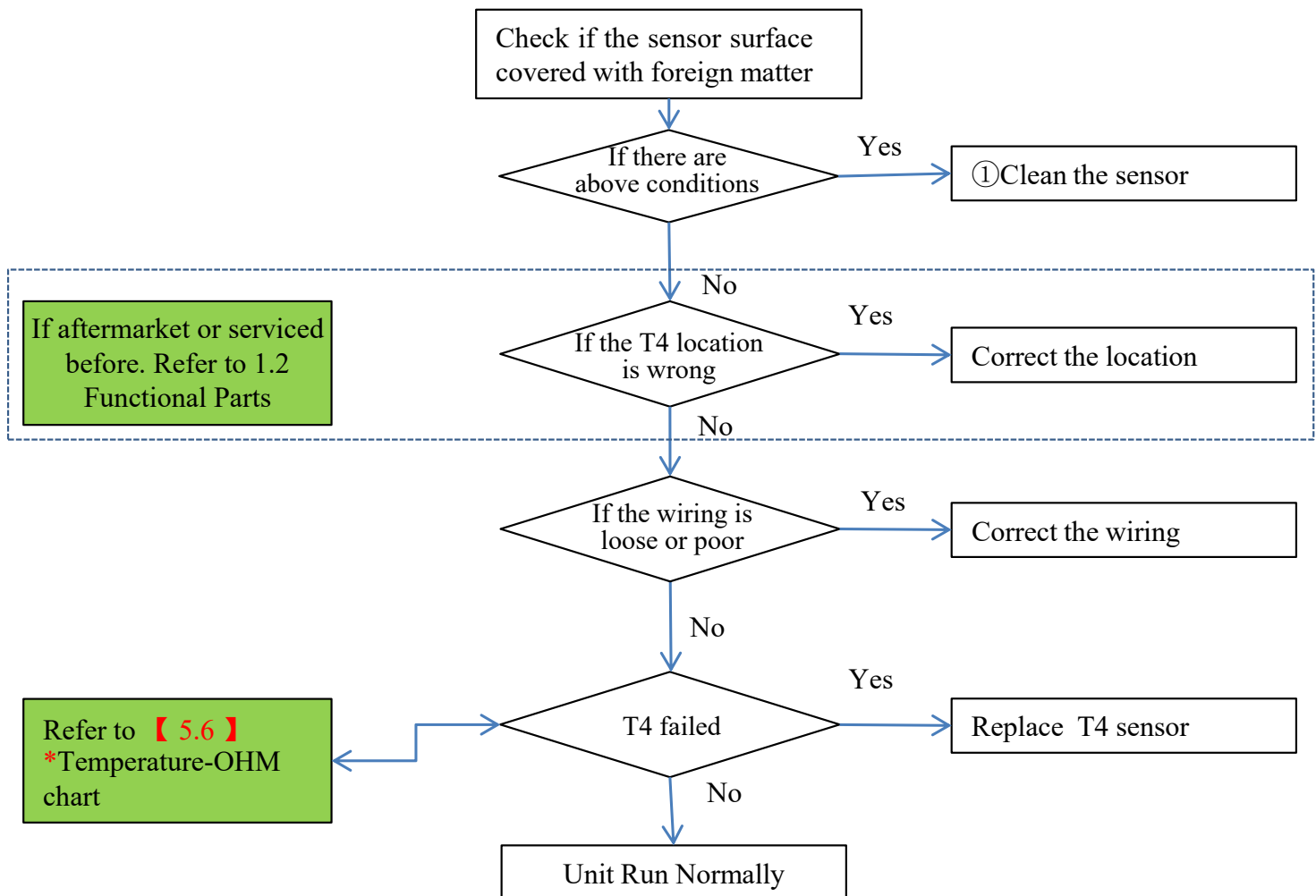
## LED2-1 Flash/Cycle

<b>Issue</b>	LED2-1 Flash/Cycle
<b>Model</b>	All
<b>Fault Name</b>	T3 sensor not reading correctly in cooling
<b>Classification</b>	System Fault
<b>Possible Cause</b>	<ul style="list-style-type: none"> <li>• Wrong location of T3 sensor</li> <li>• Faulty T3 sensor</li> <li>• The wiring terminal is loose or poor</li> <li>• The sensor surface is covered with foreign matter</li> </ul>



## LED2-2 Flash/Cycle

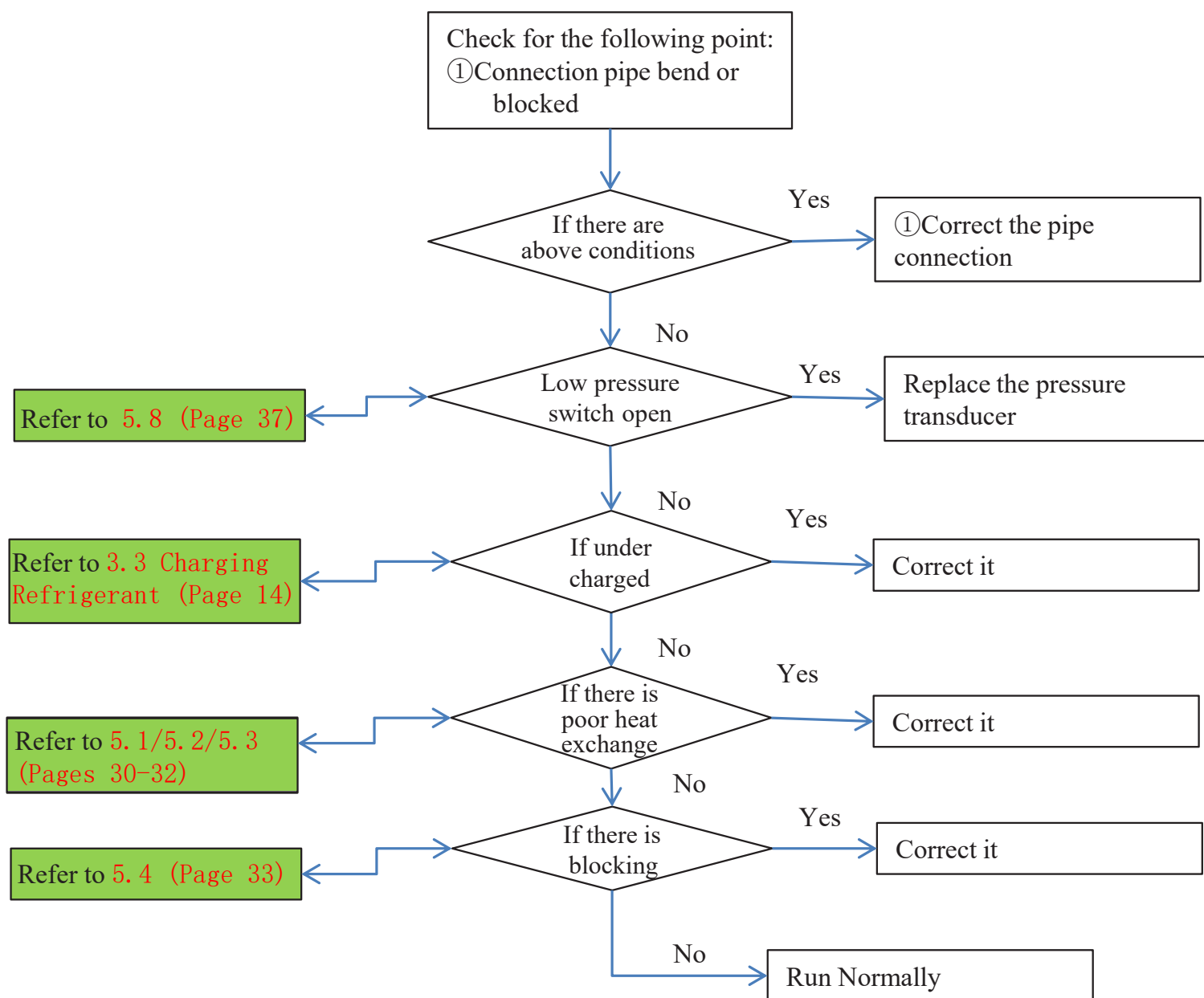
<b>Issue</b>	LED2-2 Flash/Cycle
<b>Model</b>	All
<b>Fault Name</b>	T4 sensor not reading correctly in cooling
<b>Classification</b>	System Fault
<b>Possible Cause</b>	<ul style="list-style-type: none"> <li>• Wrong location of T4 sensor</li> <li>• Faulty T4 sensor</li> <li>• The wiring terminal is loose or poor</li> <li>• The sensor surface is covered with foreign matter</li> </ul>





## LED2-3 Flash/Cycle

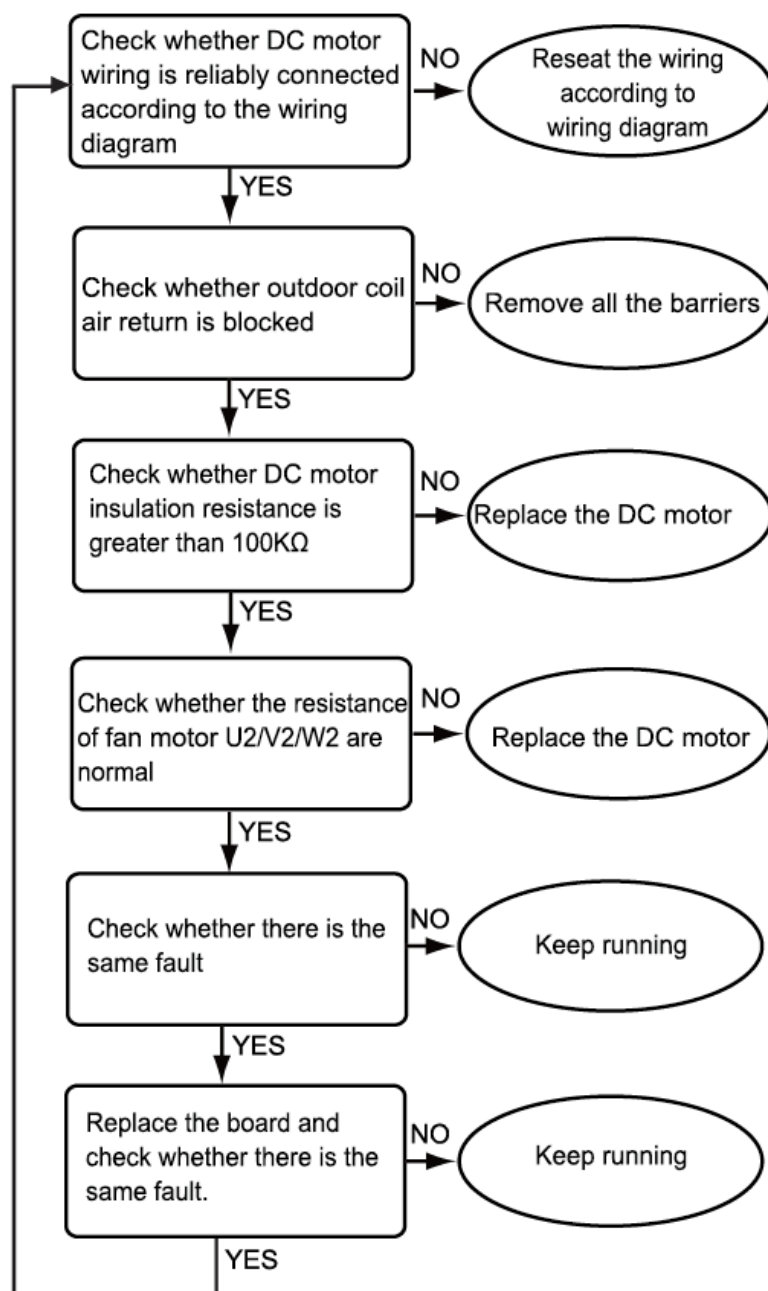
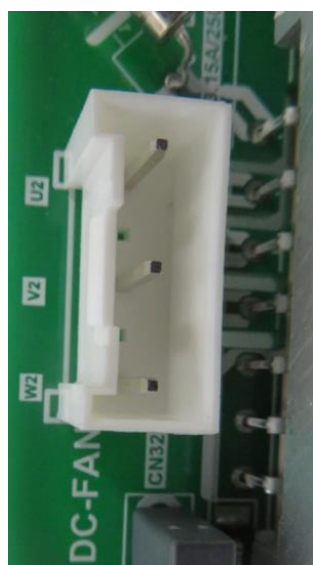
<b>Issue</b>	LED2-3 Flash/Cycle
<b>Model</b>	All
<b>Fault Name</b>	Low pressure protection
<b>Classification</b>	System Fault
<b>Possible Cause</b>	<ul style="list-style-type: none"> <li>Indoor fan stopped abnormally / poor heat exchange</li> <li>Orifice/filter drier/indoor coil blocked</li> <li>Under-charged</li> </ul>



# 4 TROUBLESHOOTING

## LED2-5 Flash/Cycle

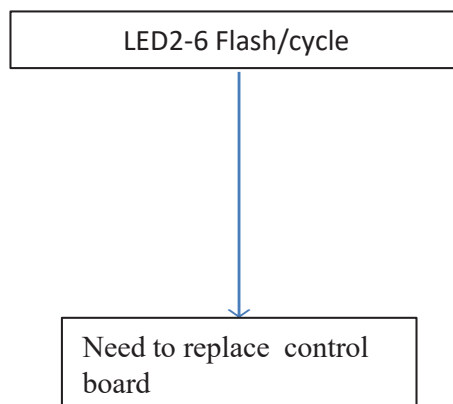
<b>Issue</b>	LED2-5 Flash/Cycle
<b>Model</b>	All
<b>Fault Name</b>	DC fan motor fault
<b>Classification</b>	Electric issue
<b>Possible Cause</b>	<ul style="list-style-type: none"> <li>Start electromagnetic interference</li> <li>Motor failed</li> <li>Electric issue</li> </ul>



Refer to 5.10 (Page 39)

## LED2-6 Flash/Cycle

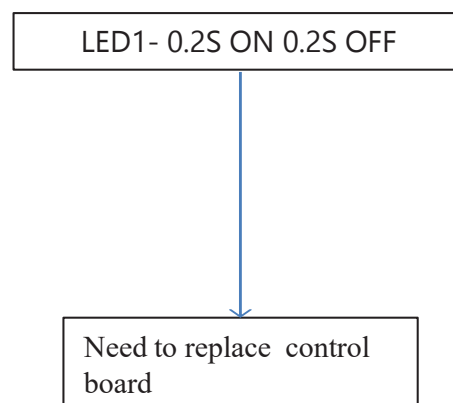
<b>Issue</b>	LED2-6 Flash/Cycle
<b>Model</b>	All
<b>Fault Name</b>	No machine type
<b>Classification</b>	Electric issue
<b>Possible Cause</b>	<ul style="list-style-type: none"> <li>• Speed message isn't in main board</li> <li>• Control board broken</li> </ul>



## 4.4 Motor Driver Module Troubleshooting

## LED1 - 0.2s On / 0.2s Off

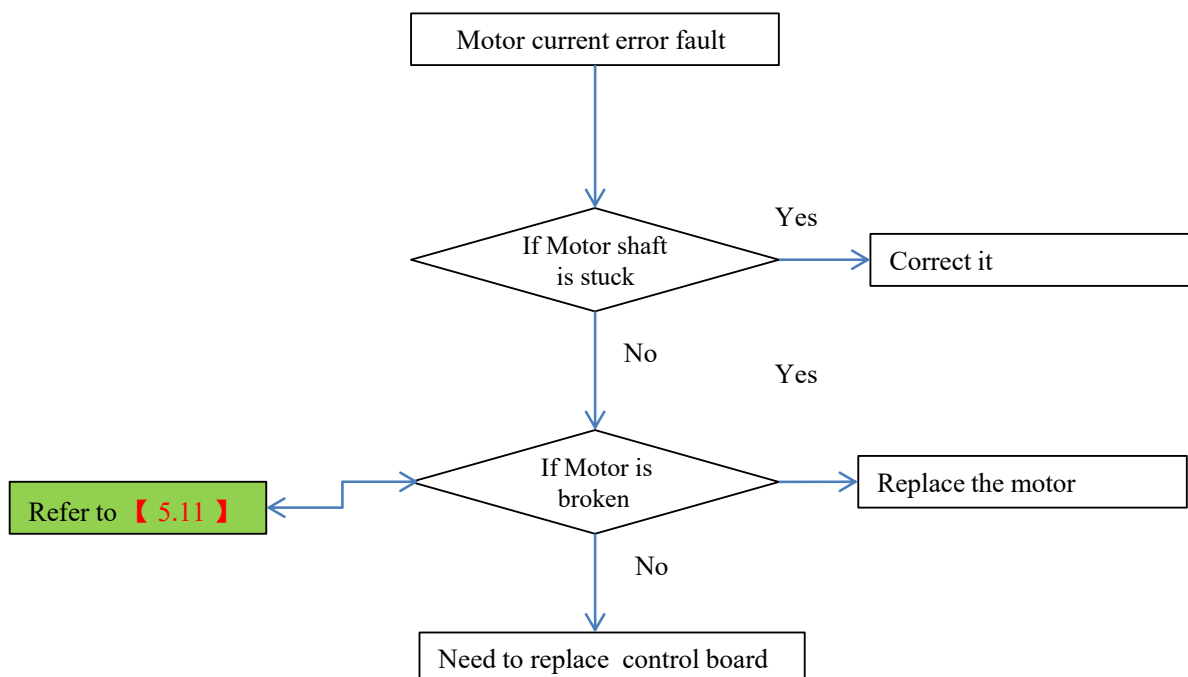
<b>Issue</b>	LED1 - 0.2s On / 0.2s Off
<b>Model</b>	All
<b>Fault Name</b>	Integrated circuit communication error fault
<b>Classification</b>	Electric issue
<b>Possible Cause</b>	<ul style="list-style-type: none"> <li>• Motor driver module poor contact</li> <li>• Control board broken</li> </ul>



# 4 TROUBLESHOOTING

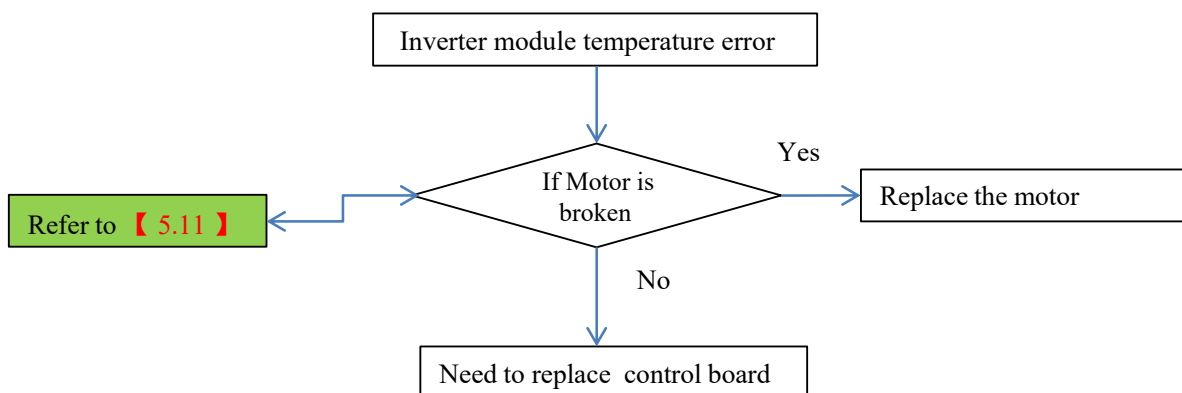
## LED1-1 Flash/Cycle

<b>Issue</b>	LED1-1 Flash/Cycle
<b>Model</b>	All
<b>Fault Name</b>	Motor current error fault
<b>Classification</b>	Electric issue
<b>Possible Cause</b>	<ul style="list-style-type: none"><li>• Motor shaft stuck</li><li>• Motor broken</li><li>• Control board broken</li></ul>



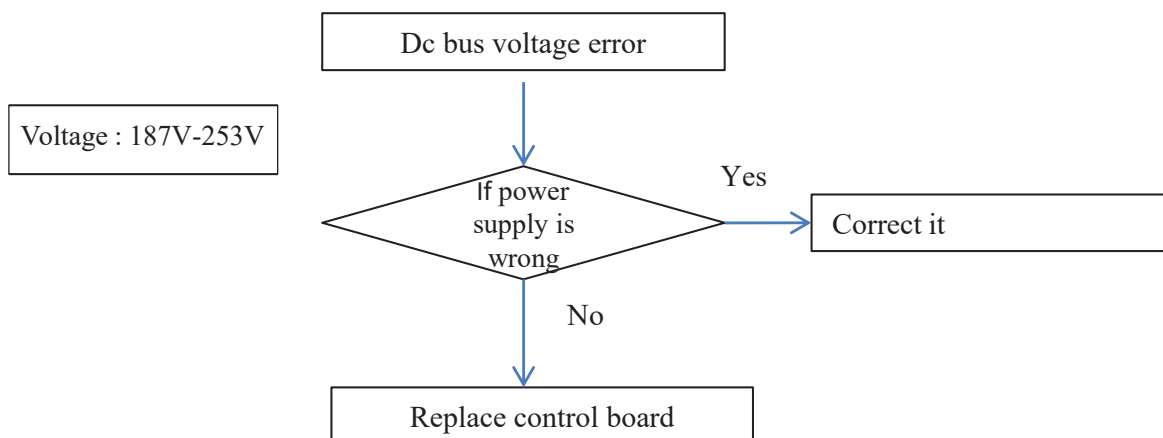
## LED1-2 Flash/Cycle

<b>Issue</b>	LED1-2 Flash/Cycle
<b>Model</b>	All
<b>Fault Name</b>	Inverter module temperature error
<b>Classification</b>	Electric issue
<b>Possible Cause</b>	<ul style="list-style-type: none"><li>• Motor is broken</li><li>• Control board is broken</li></ul>



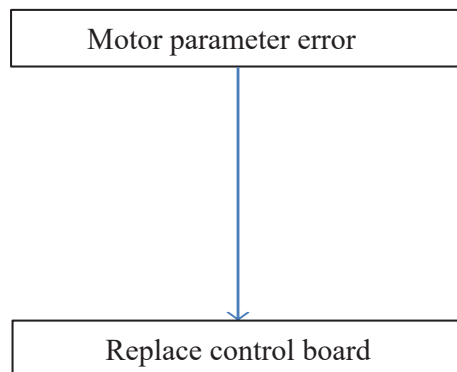
## LED1-3 Flash/Cycle

<b>Issue</b>	LED1-3 Flash/Cycle
<b>Model</b>	All
<b>Fault Name</b>	DC bus voltage error
<b>Classification</b>	Electric issue
<b>Possible Cause</b>	<ul style="list-style-type: none"> <li>Power supply wrong</li> <li>Control board broken</li> </ul>



## LED1-4 Flash/Cycle

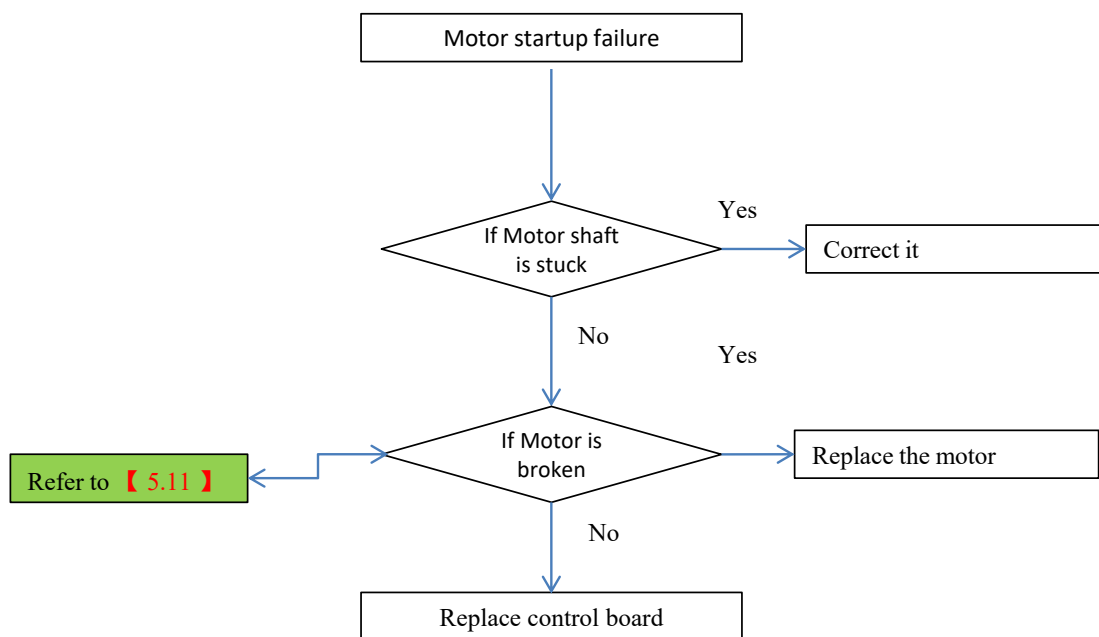
<b>Issue</b>	LED1-4 Flash/Cycle
<b>Model</b>	All
<b>Fault Name</b>	Motor Parameter Error
<b>Classification</b>	Electric issue
<b>Possible Cause</b>	<ul style="list-style-type: none"> <li>Control board broken</li> </ul>



# 4 TROUBLESHOOTING

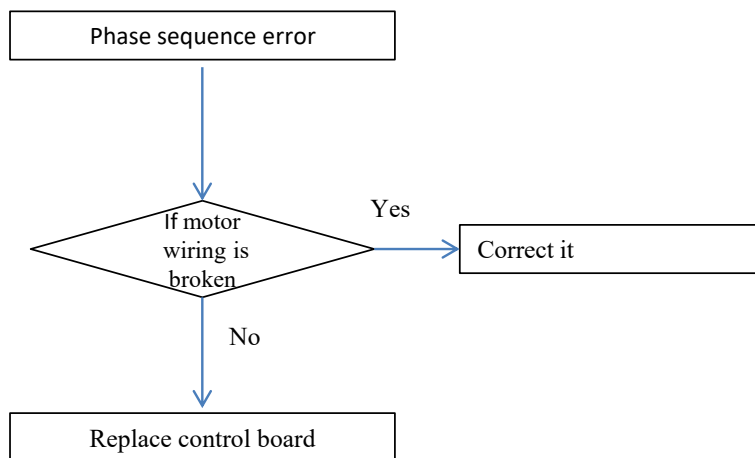
## LED1-5 Flash/Cycle

<b>Issue</b>	LED1-5 Flash/Cycle
<b>Model</b>	All
<b>Fault Name</b>	Motor startup failure
<b>Classification</b>	Electric issue
<b>Possible Cause</b>	<ul style="list-style-type: none"><li>• Motor broken</li><li>• Motor shaft stuck</li><li>• Control board broken</li></ul>

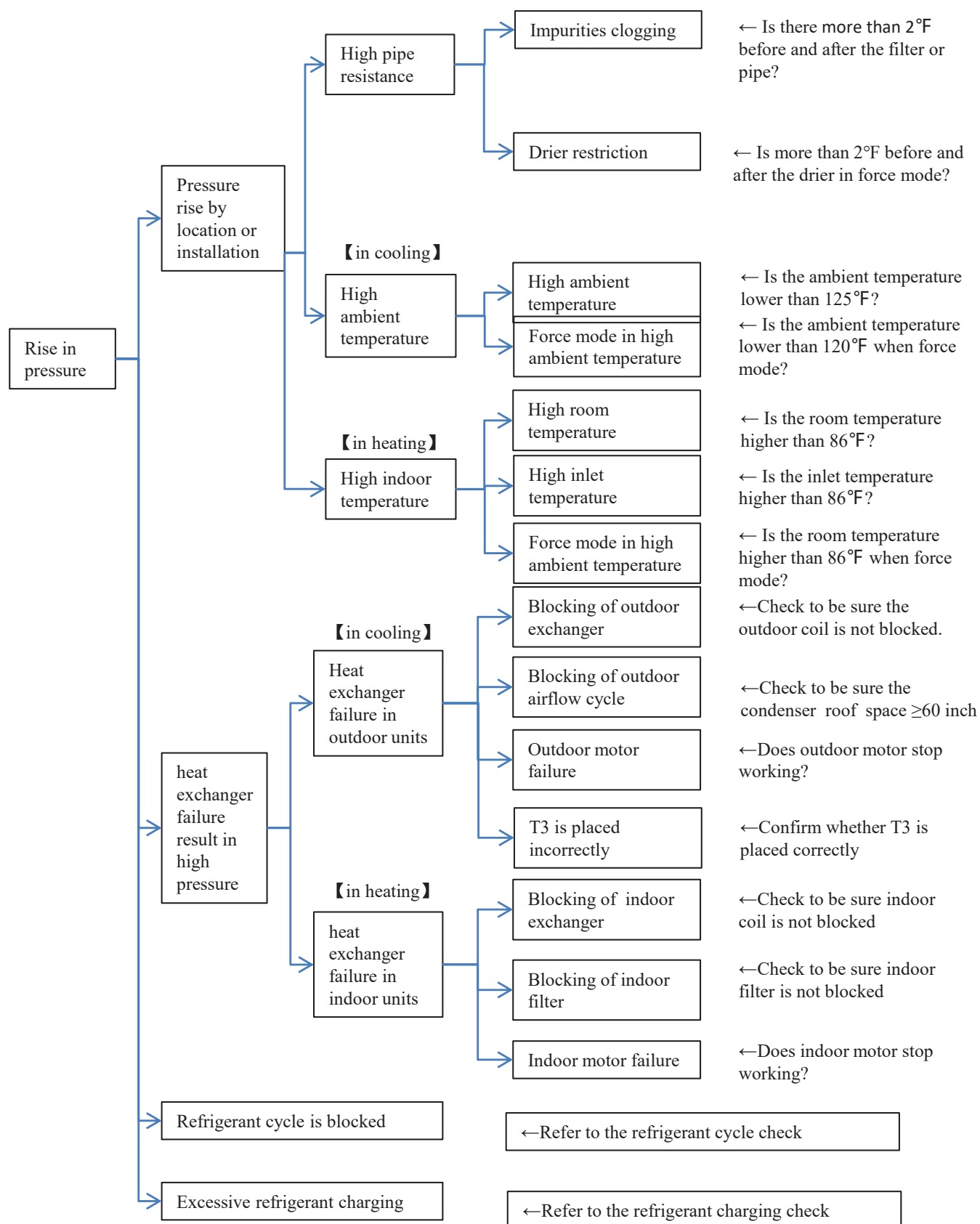


## LED1-6 Flash/Cycle

<b>Issue</b>	LED1-6 Flash/Cycle
<b>Model</b>	All
<b>Fault Name</b>	Phase sequence error
<b>Classification</b>	Electric issue
<b>Possible Cause</b>	<ul style="list-style-type: none"><li>• Motor wiring broken</li><li>• Control board broken</li></ul>



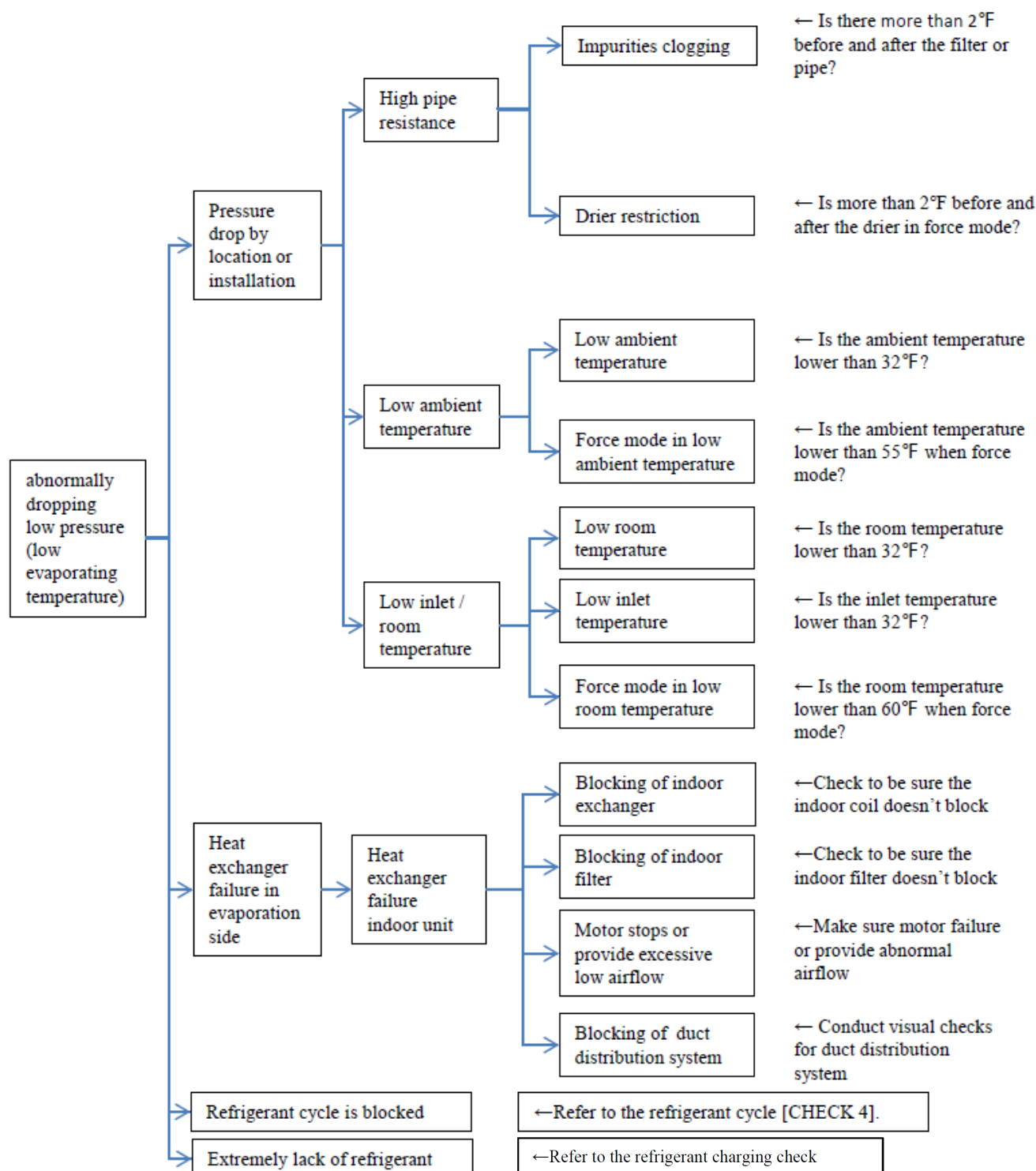
## 5.1 High Pressure Rise



# 5 SYSTEM CHECKS

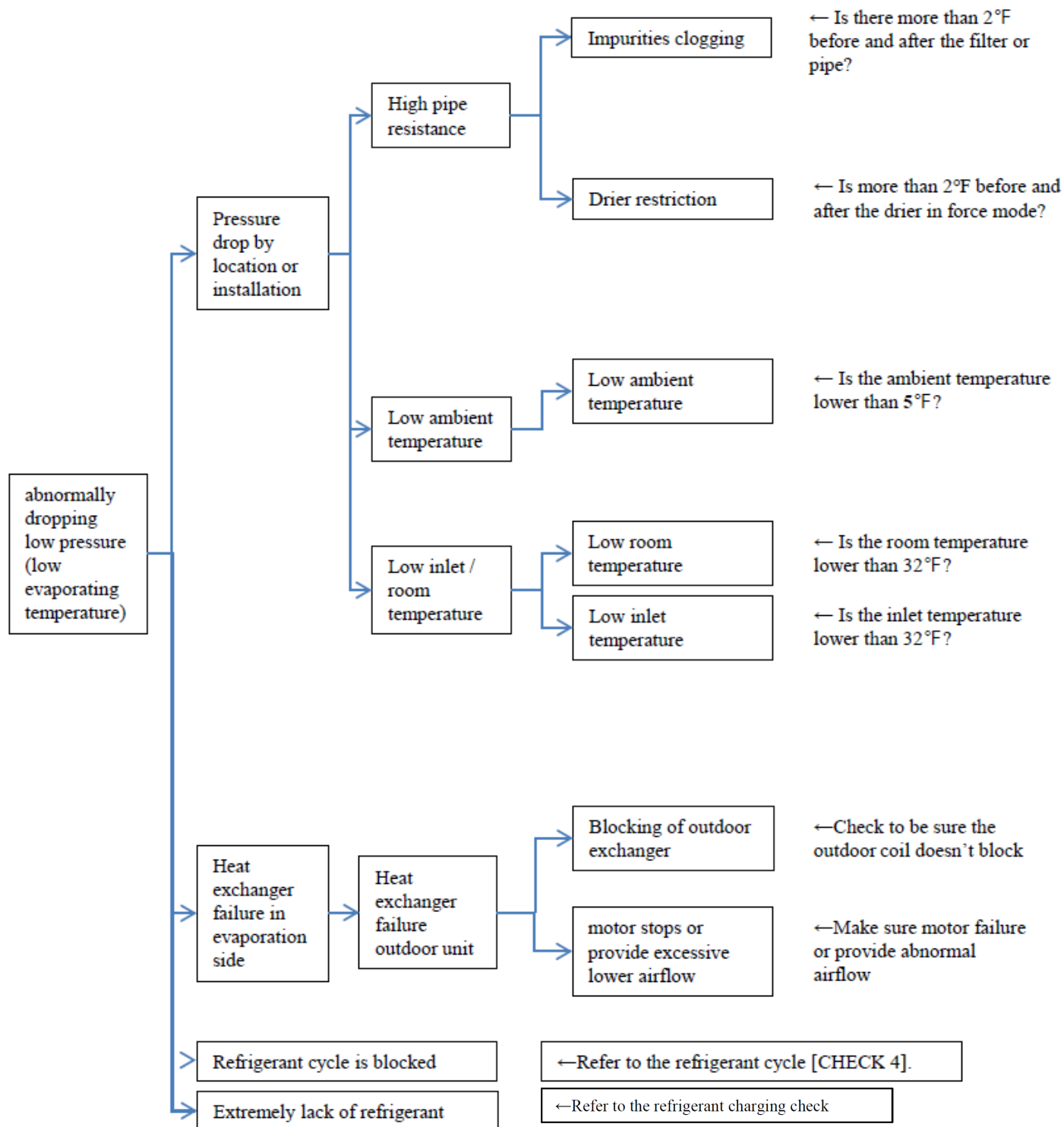
## 5.2 Low Pressure Drop-Cooling

Note: 110-140 PSIG head pressure is normal in cooling conditions. The value may be lower/higher at maximum/minimum/limited frequency of compressor operation, start-up, or return oil stages



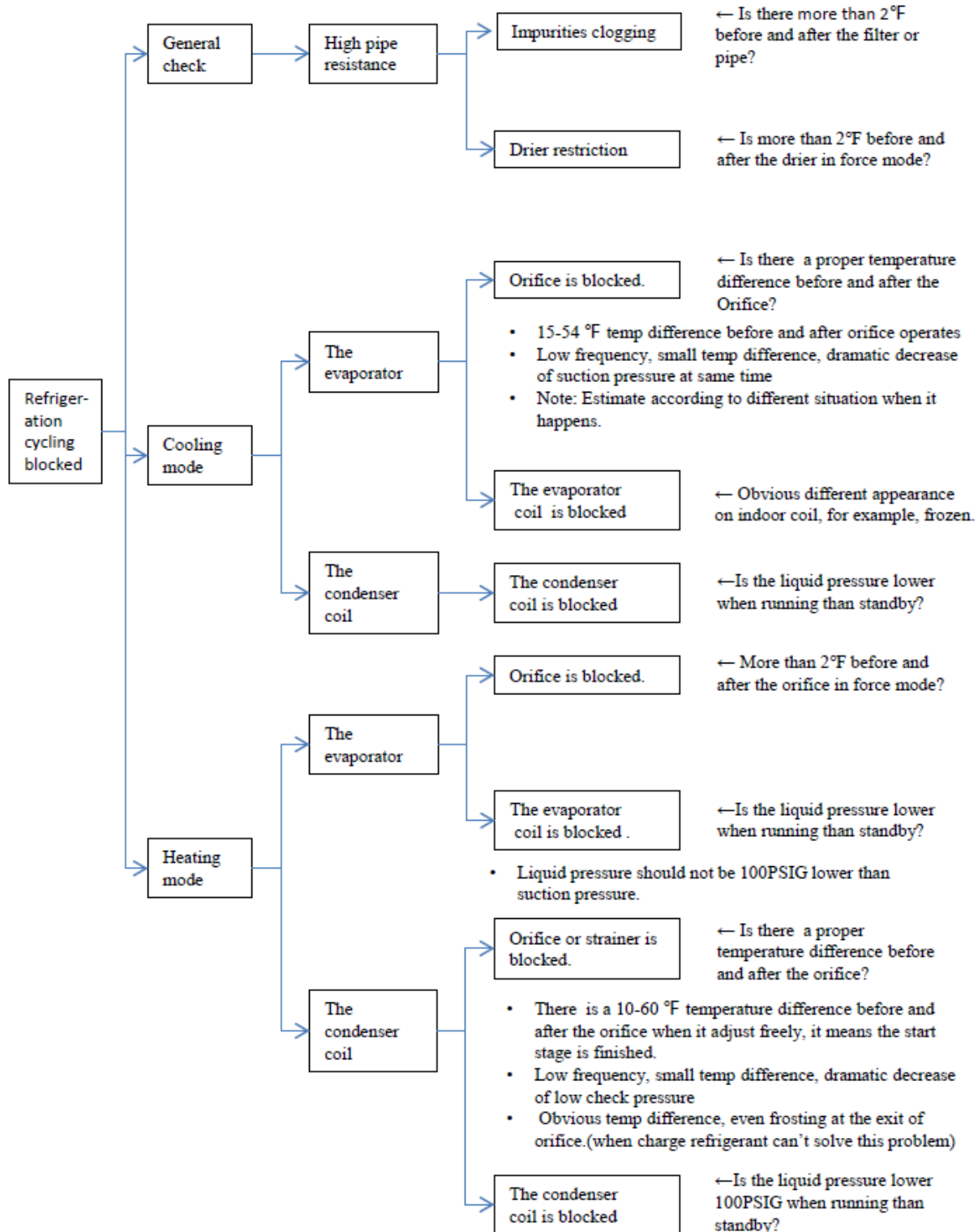


## 5.3 Low Pressure Drop-Heating

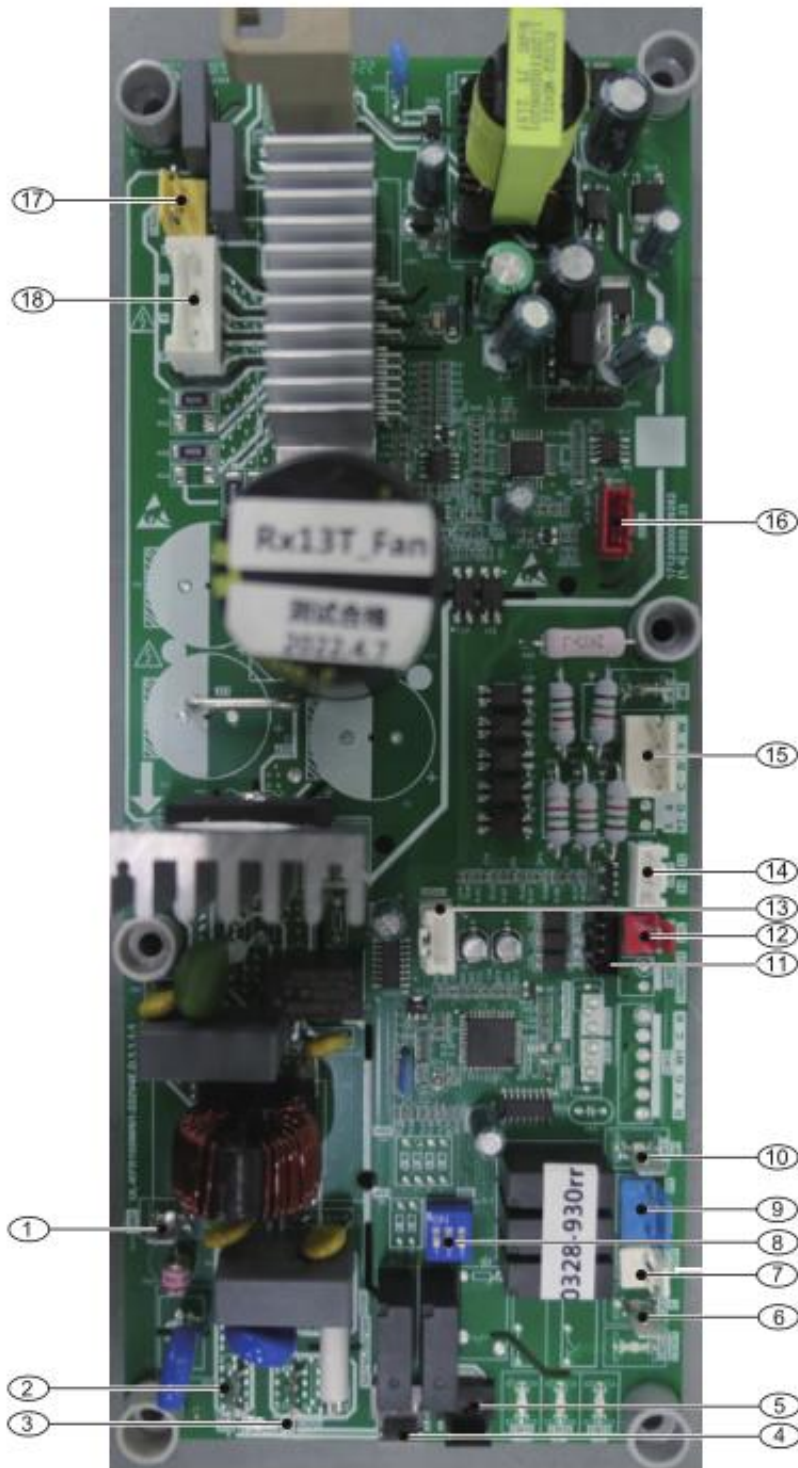


## 5.4 Blocked Refrigeration Cycling

Note: Check both in normal and forced modes as some problems will become more obvious.



## 5.5 Control Board



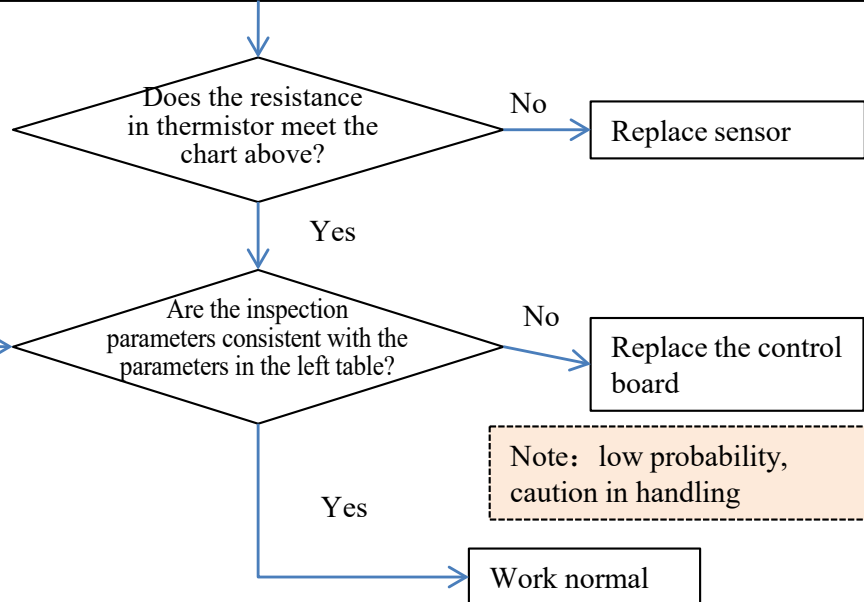
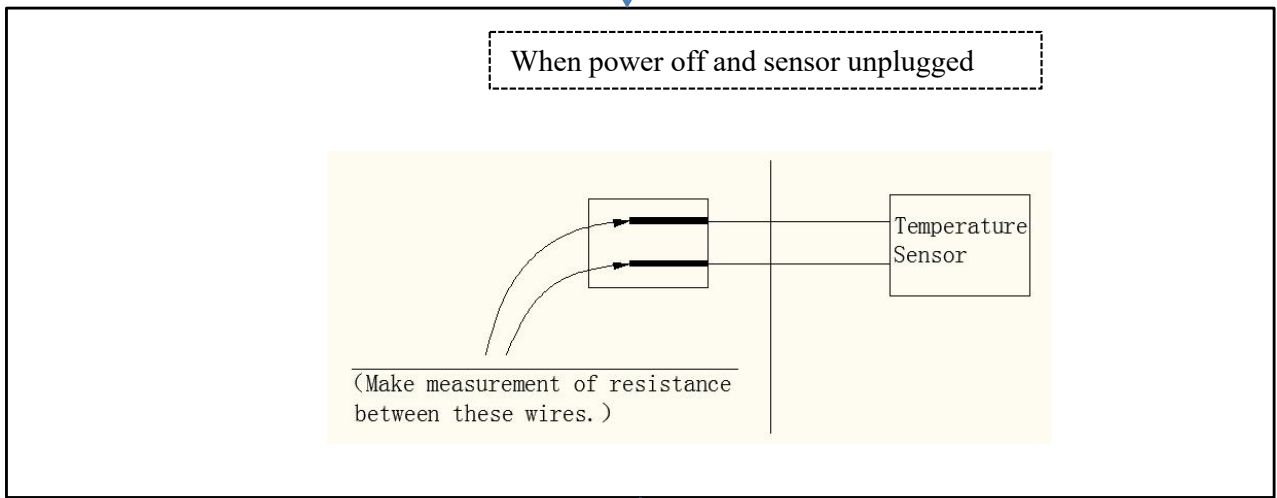
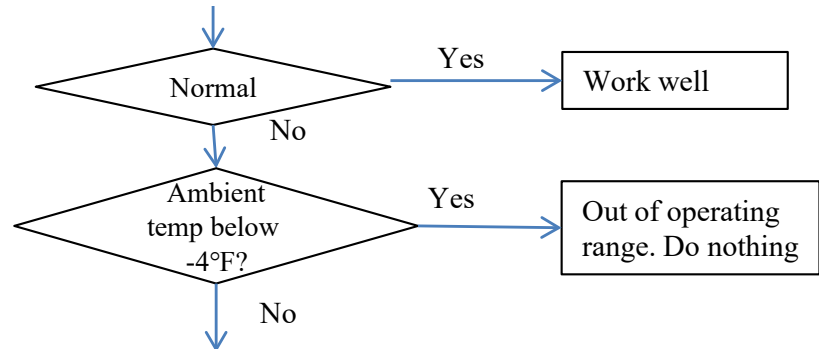
No.	Function description
1	GND port
2	Power input port
3	Power input port
4	Compressor crankcase heater port (heat pump only)
5	Pressure equalizer valve port (Rotary compressor only)
6	Reserve
7	Compressor contactor control port
8	SW3 Dip SWITCH: Defrost logic settings
9	Reversing valve port (heat pump only)
10	Reserve
11	Message port
12	Low pressure switch port (heat pump only)
13	Main board debug port
14	T3 T4 sensor port
15	Thermostat wire connections
16	Motor drive debug port
17	Reserve
18	DC motor port

## 5.6 Temperature Sensor T3/T4

### Check temperature transducer (T3/T4):

Compare the temperature checked. It's normal if the temperature difference is within 15°F when in standby mode. Avoid waste heat effect T5/Tf when in standby mode.

T3/T4: 77 °F --10KΩ



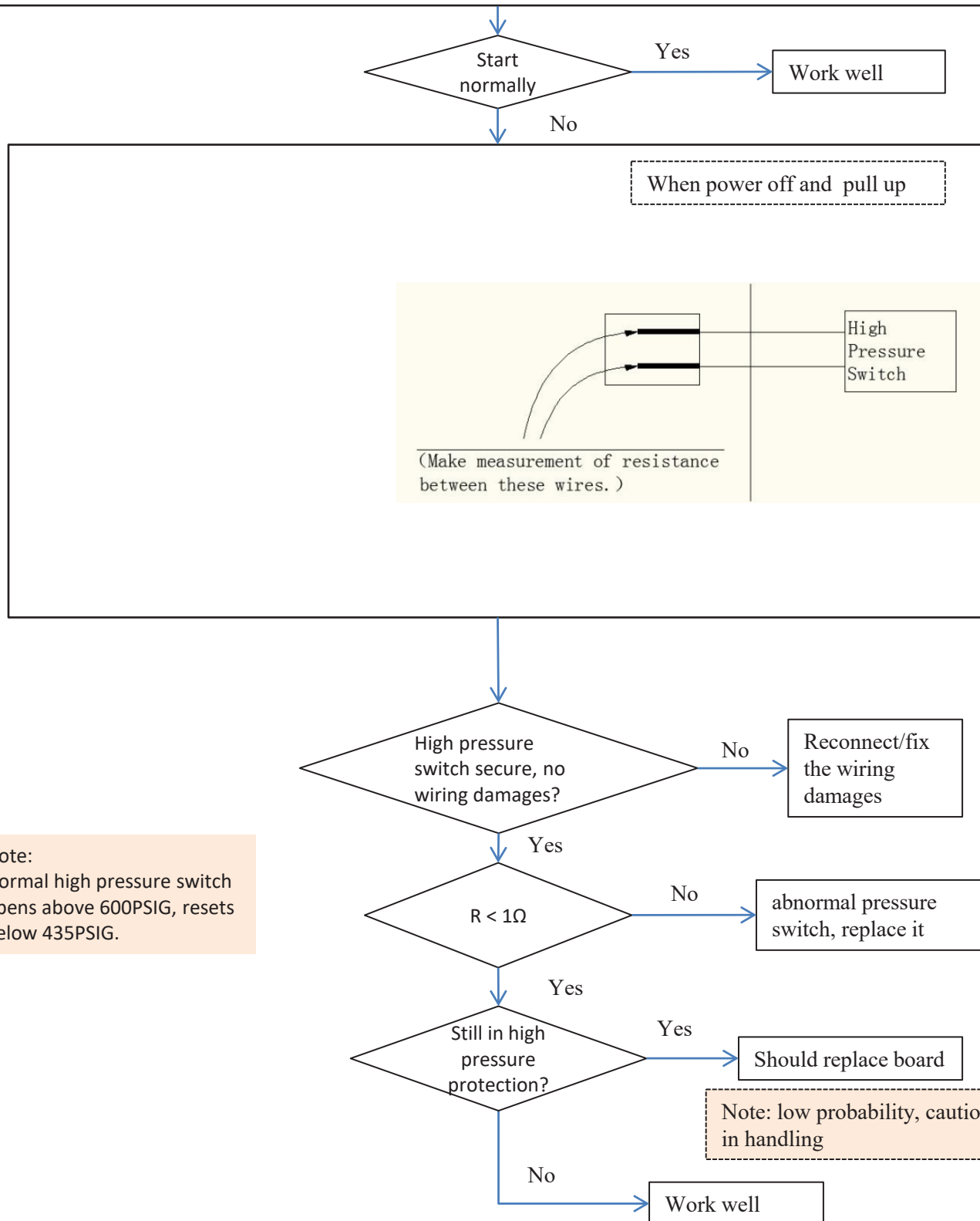
Refer to 6.5 (Page 48)

Note: low probability, caution in handling

## 5.7 High Pressure Switch (HPS)

### High Pressure Switch:

Ensure the switch starts normally when the unit is powered on



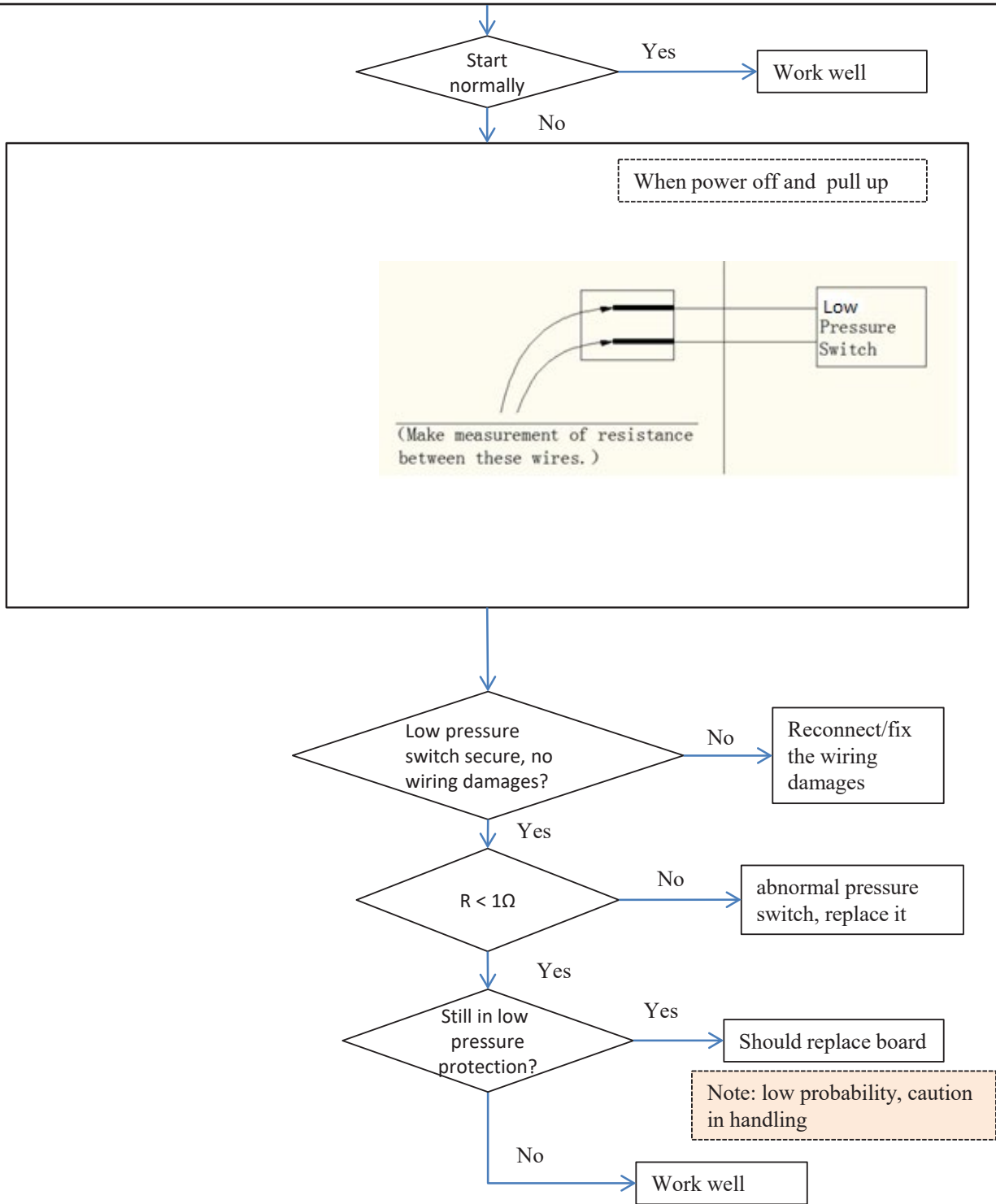
Note:  
Normal high pressure switch opens above 600PSIG, resets below 435PSIG.

# 5 SYSTEM CHECKS

## 5.8 Low Pressure Switch (LPS)

### Low Pressure Switch:

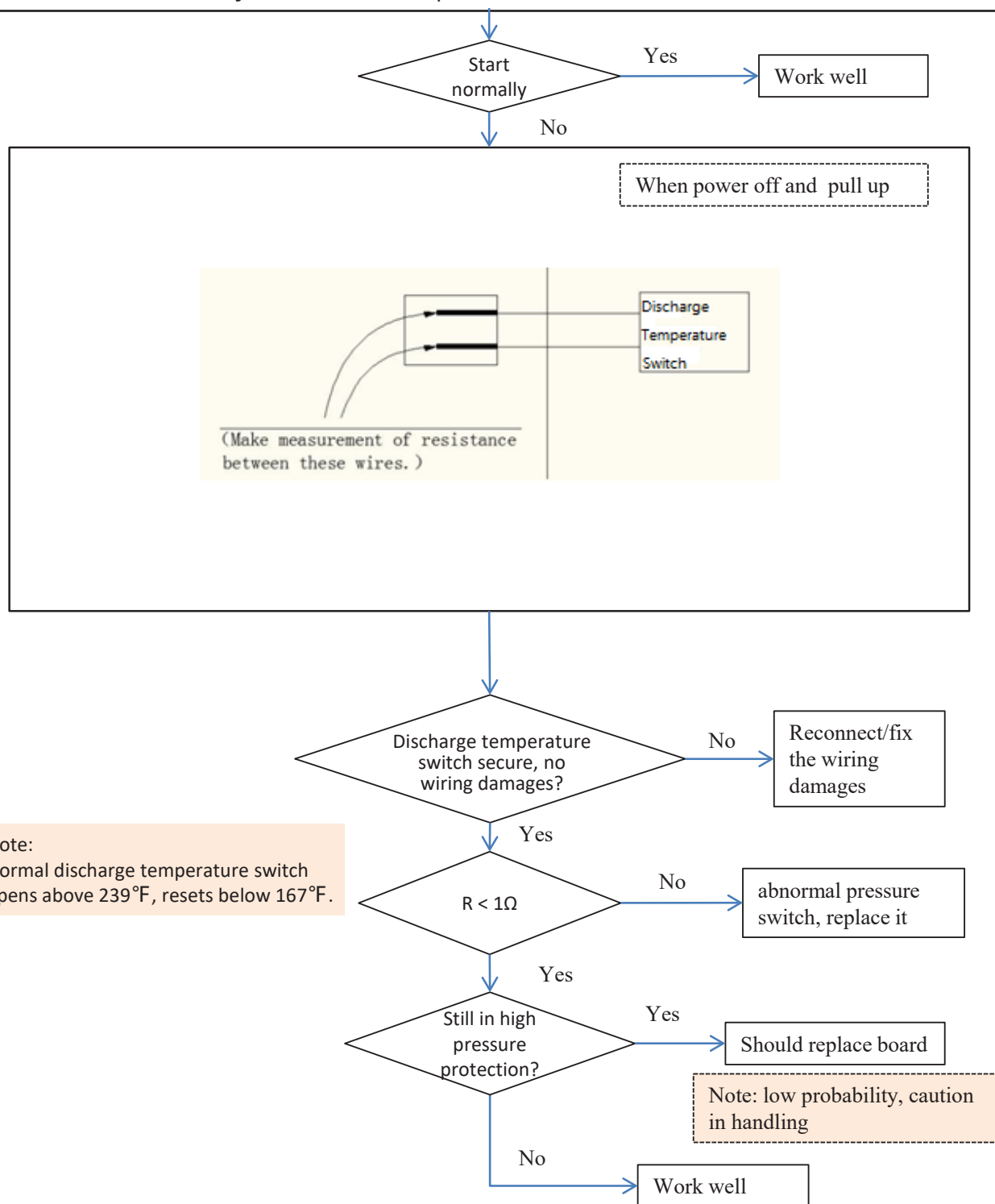
Ensure the switch starts normally when the unit is powered on



## 5.9 Discharge Temperature Switch (T5)

### Discharge Temperature Switch:

Ensure the switch starts normally when the unit is powered on

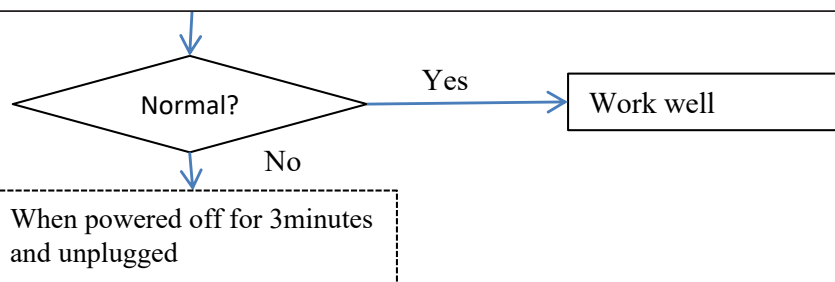


# 5 SYSTEM CHECKS

## 5.10 Condenser Fan Motor

### Condenser Fan Motor:

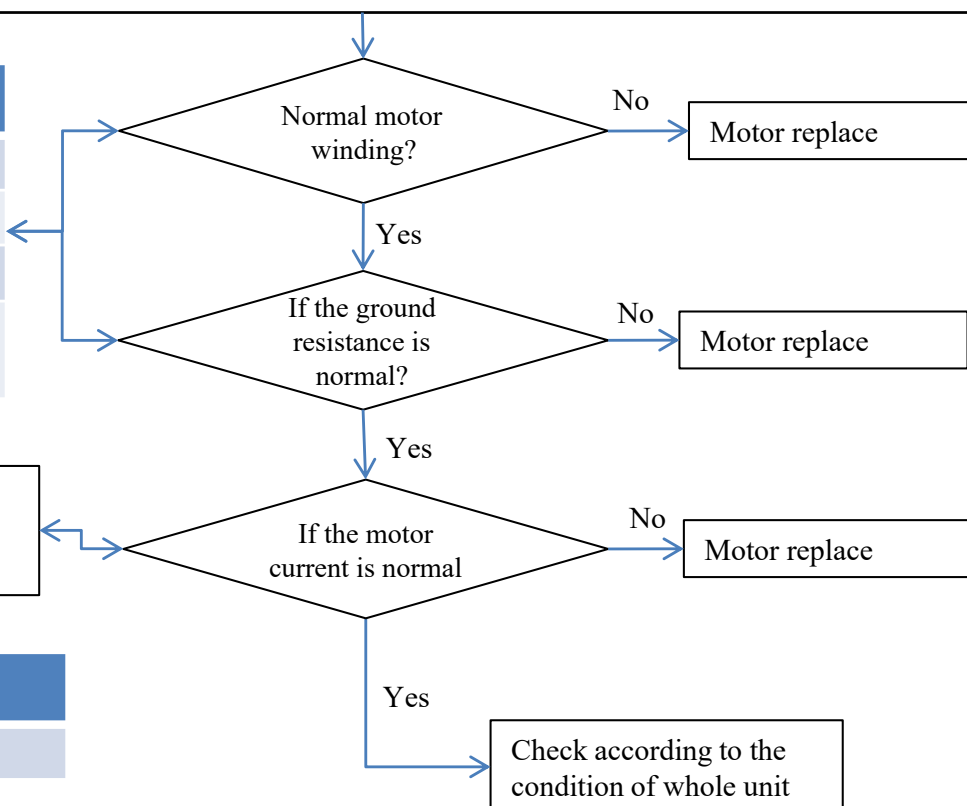
Ensure the fan starts normally when the unit is powered on



Resistance (Ω)	200W
Between U and V	<36
Between V and W	<36
Between W and U	<36
Between U/V/W and ground	>10M

If the current is pulsating violently or abnormally beyond the "B" value

Motor output (W)	B(A)
200	2.2

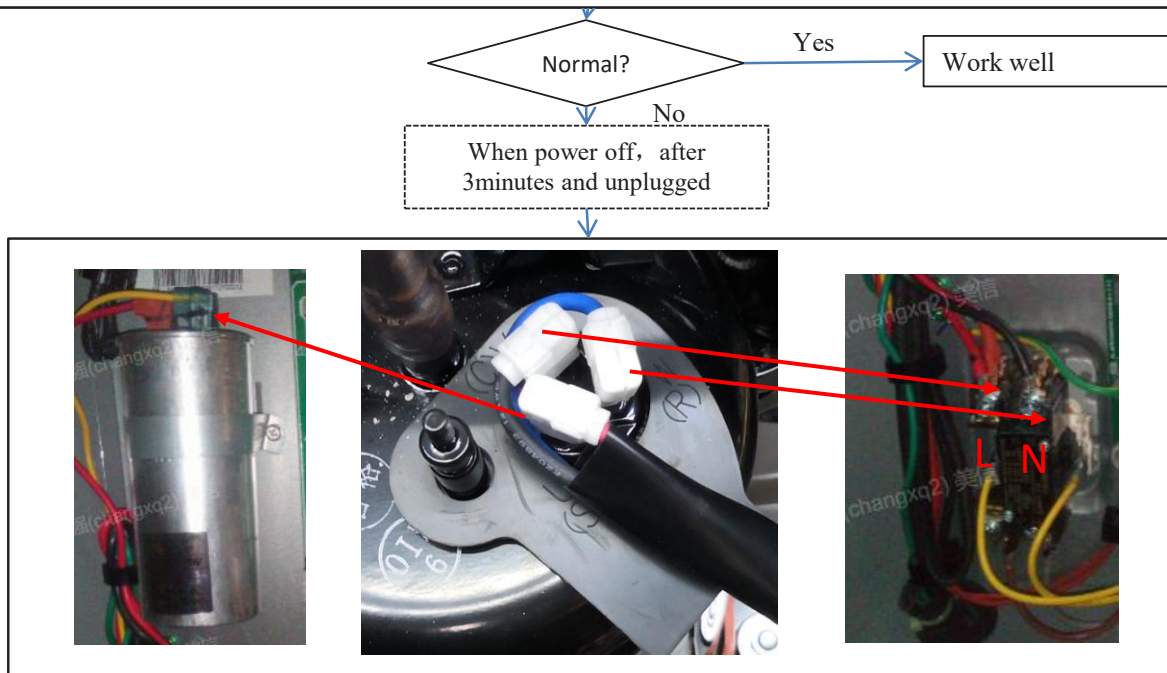




## 5.11 Compressor

### Compressor:

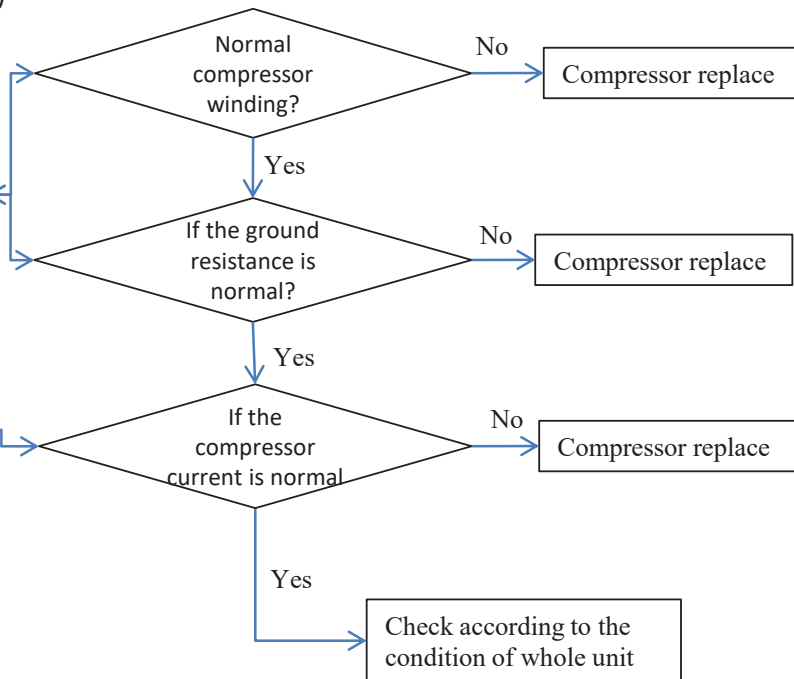
Ensure the compressor can start normally



For Scroll compressor, supply wiring is unitary, you can check it with colour (Red for L1, Black for L2, White for S)

Resistance ( $\Omega$ )	Rotary	Scroll
Between R and C ( L1 and L2 )	<2	<2
Between C and S (L1 and S)	<2	<1
Between R and S (L2 and S)	<4	<1
Between U/V/W and ground	>10M	>10M

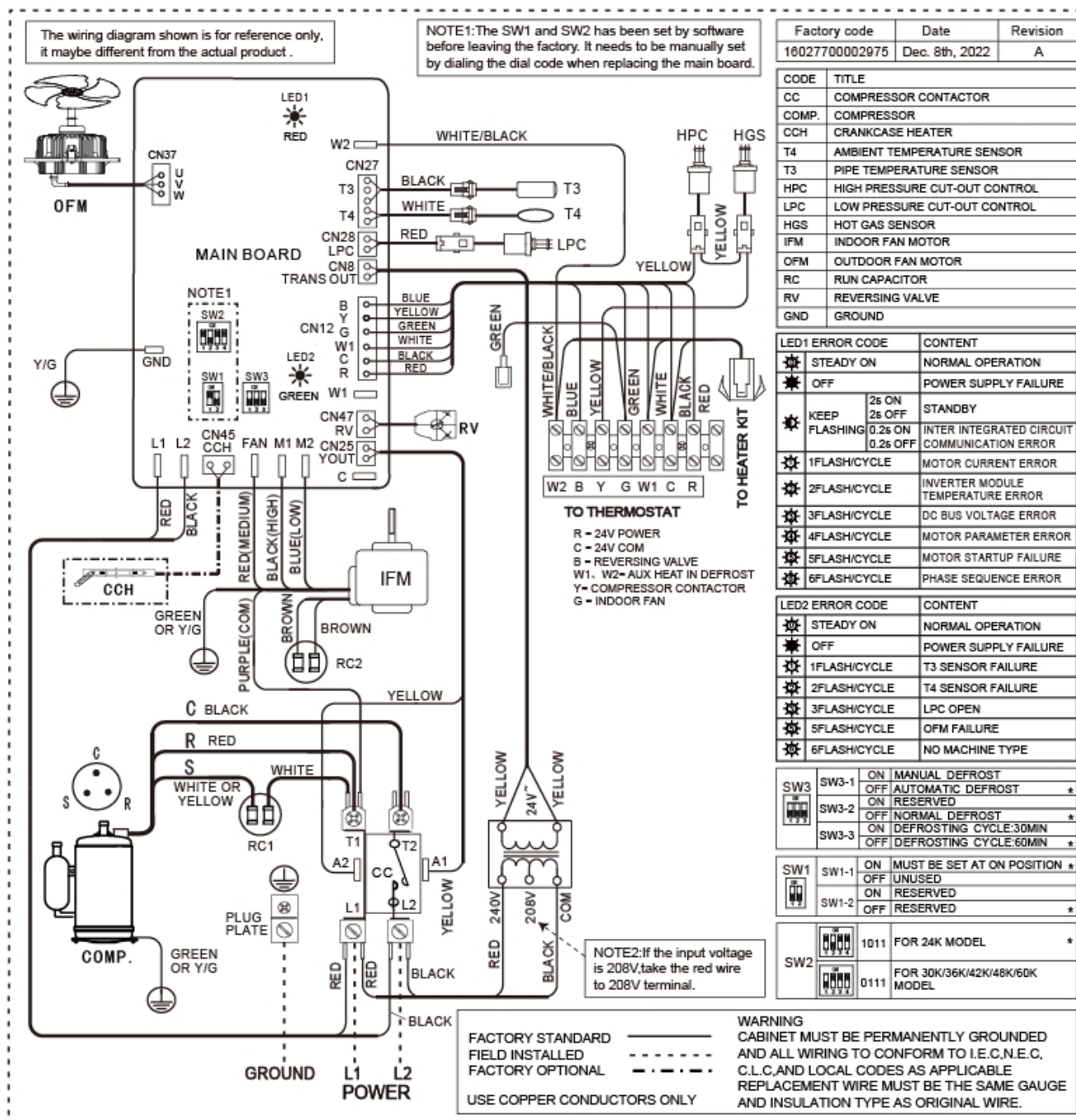
If the current is pulsating violently or abnormally beyond the "B" value



Model	2Ton	2.5Ton	3Ton	3.5Ton	4Ton	5Ton
B(A)	12	13	18	20	24	30

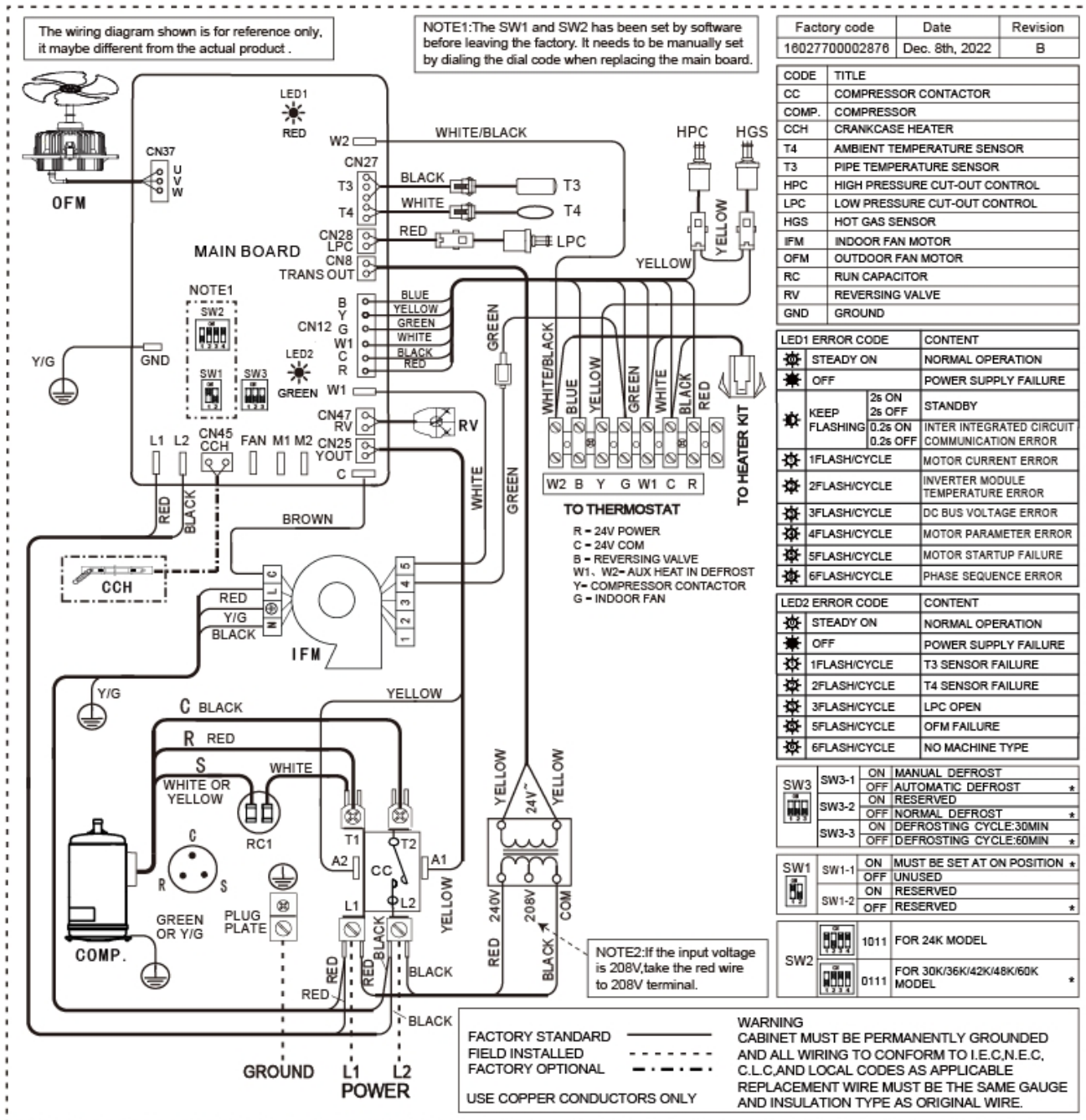
## 6.1 Wiring Diagrams

24K:



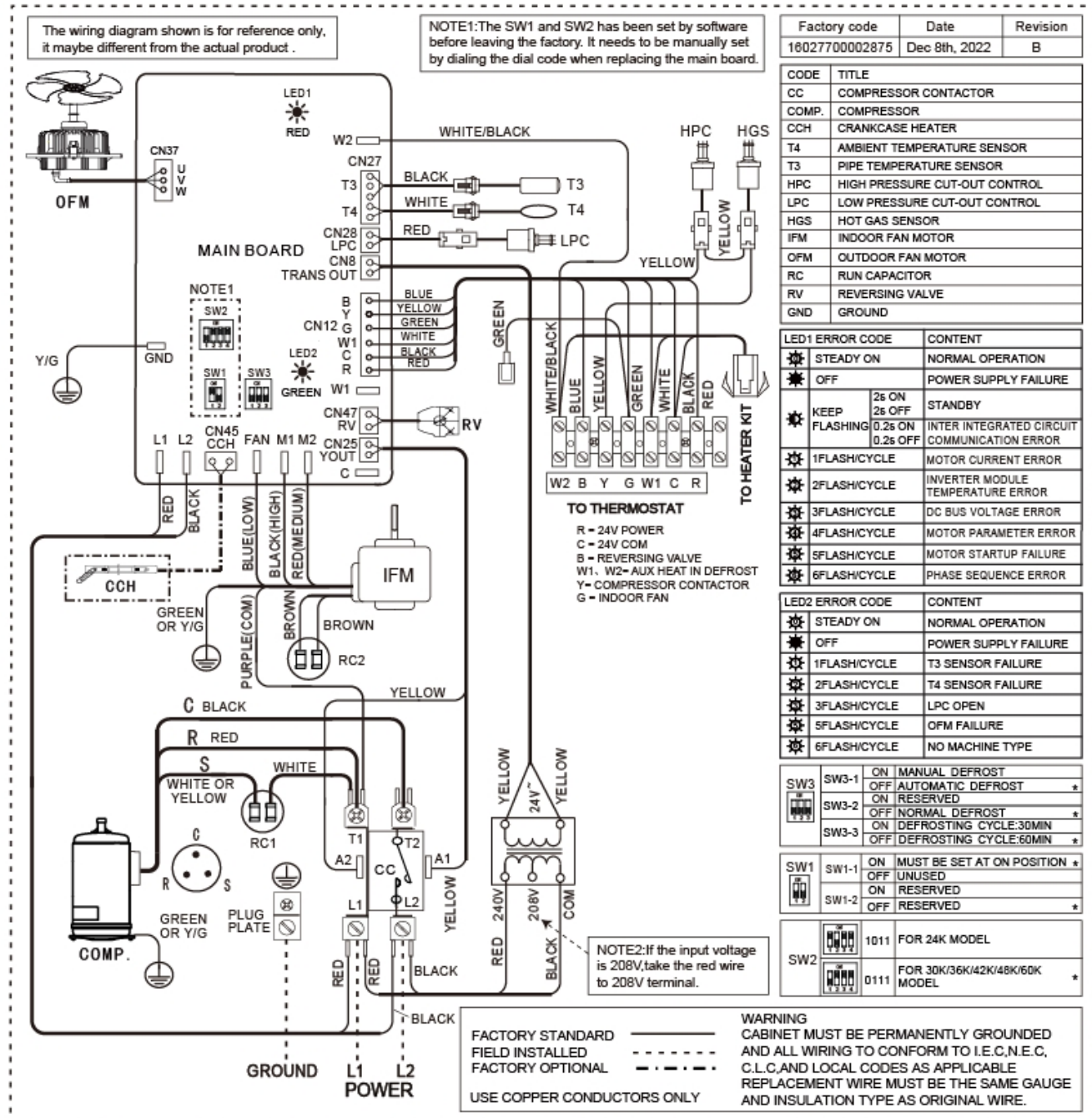


## 36K/60K:



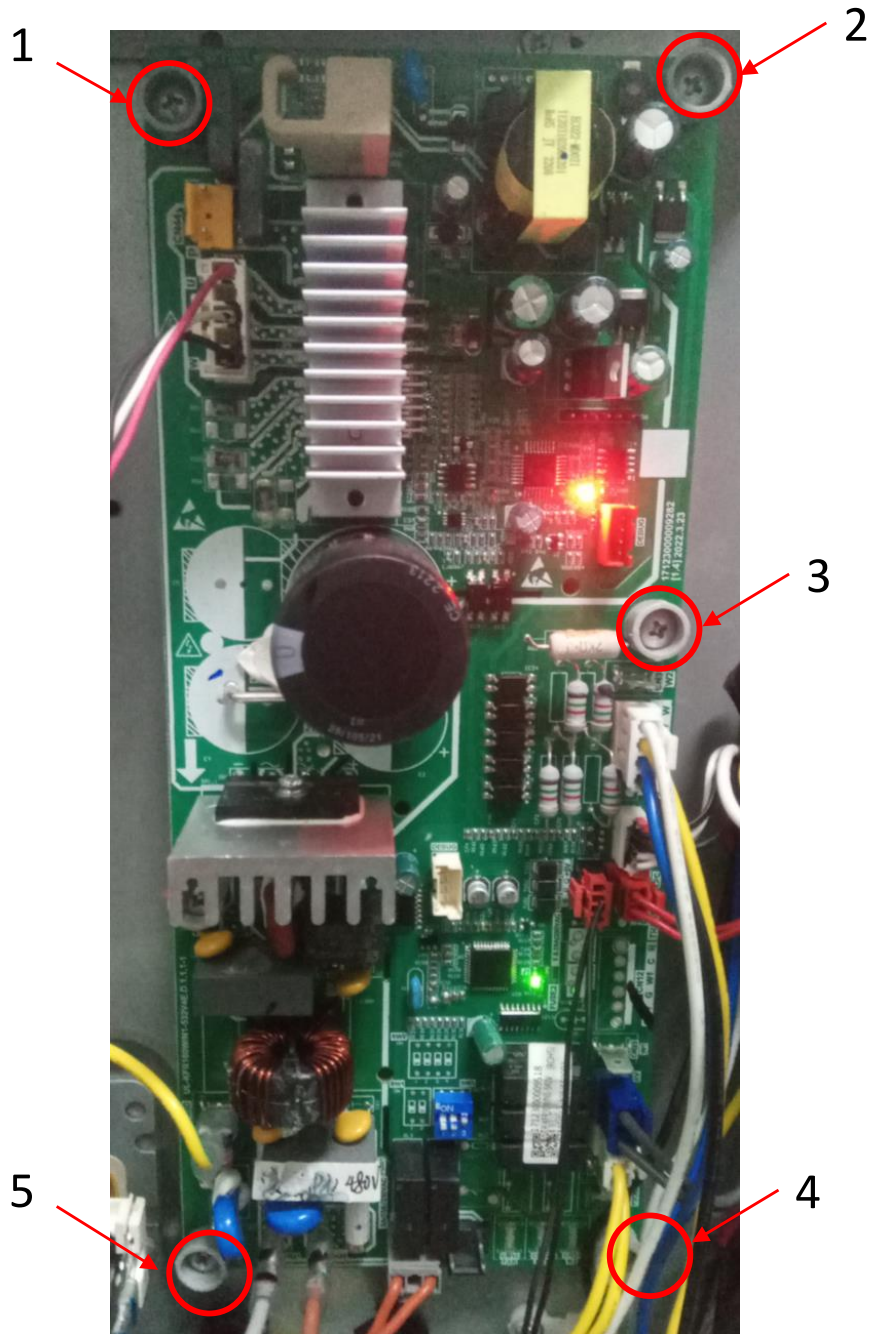


## 42K/48K:



















## 6.2 Control Board Replacement Procedure

1. Power off and wait at least 3 minutes before opening the electric control box.
2. Remove the wiring carefully.
3. Remove the 5 screws on the board (shown by the red circle and number)
4. Install the new board on the unit.
5. Fasten the 5 screws (as shown by the red circle and number)
6. Set up the SW1, SW2, and SW3 switches refer to the wiring diagram.
7. Reconnect the wires according to the wire diagram.
8. Double-check the wire connection, screws, thermal paste, etc.



## 6.3 Fault Codes of Motor Driver &amp; Main Control Modules

Fault Code of Motor Driver Module		
	Steady On	Normal Operation
	Off	Power Supply Failure
	Keep Flashing	2s On 2s Off Standby
		0.2s On 0.2s Off Integrated Circuit Communication Error
	1 Flash/Cycle	Motor Current Error
	2 Flash/Cycle	Inverter Module Temperature Error
	3 Flash/Cycle	DC Bus Voltage Error
	4 Flash/Cycle	Motor Parameter Error
	5 Flash/Cycle	Motor Startup Failure
	6 Flash/Cycle	Phase Sequence Error

Fault Code of Motor Driver Module		
	Steady On	Normal Operation
	Off	Power Supply Failure
	1 Flash/Cycle	Motor Current Error
	2 Flash/Cycle	Inverter Module Temperature Error
	3 Flash/Cycle	DC Bus Voltage Error
	5 Flash/Cycle	Motor Startup Failure
	6 Flash/Cycle	Phase Sequence Error

## 6.4 Troubleshooting Guide

System Faults	Refrigerant Circuit																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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C- Cooling  
H- Heating  
P- Primary Causes  
S- Secondary Causes



## 6.5 Temperature &amp; Resistance Table

Temperature °F	Resistance kΩ	Temperature °F	Resistance kΩ	Temperature °F	Resistance kΩ	Temperature °F	Resistance kΩ
-4	106.73	37	29.87	78	10	119	3.69
-3	103.25	38	29.22	79	9.5	120	3.61
-2	99.89	39	28.19	80	9.26	121	3.53
-1	96.65	40	27.39	81	9.03	122	3.45
0	93.53	41	26.61	82	8.81	123	3.38
1	90.53	42	25.85	83	8.59	124	3.3
2	87.62	43	25.12	84	8.38	125	3.23
3	84.83	44	24.42	85	8.17	126	3.16
4	82.13	45	23.73	86	7.97	127	3.1
5	79.52	46	23.07	87	7.78	128	3.03
6	77.01	47	22.42	88	7.59	129	2.96
7	74.58	48	21.8	89	7.4	130	2.9
8	72.24	49	21.2	90	7.22	131	2.84
9	69.98	50	20.61	91	7.05	132	2.78
10	67.8	51	20.04	92	6.88	133	2.72
11	65.69	52	19.49	93	6.72	134	2.67
12	63.65	53	18.96	94	6.56	135	2.61
13	61.68	54	18.44	95	6.4	136	2.56
14	59.78	55	17.94	96	6.25	137	2.5
15	57.95	56	17.45	97	6.1	138	2.45
16	56.17	57	16.98	98	5.96	139	2.4
17	54.46	58	16.52	99	5.82	140	2.35
18	52.8	59	16.08	100	5.68	141	2.3
19	51.2	60	15.65	101	5.55	142	2.25
20	49.65	61	15.23	102	5.42	143	2.21
21	48.16	62	14.83	103	5.3	144	2.16
22	46.71	63	14.43	104	5.18	145	2.12
23	45.31	64	14.05	105	5.06	146	2.08
24	43.95	65	13.68	106	4.94	147	2.03
25	42.64	66	13.32	107	4.83	148	1.99
26	41.38	67	12.97	108	4.72	149	1.95
27	40.15	68	12.64	109	4.61	150	1.91
28	38.97	69	12.31	110	4.51	151	1.88
29	37.82	70	11.99	111	4.41	152	1.84
30	36.71	71	11.68	112	4.31	153	1.8
31	35.64	72	11.38	113	4.21	154	1.77
32	34.6	73	11.09	114	4.12	155	1.73
33	33.59	74	10.8	115	4.03	156	1.7
34	32.61	75	10.53	116	3.94	157	1.66
35	31.67	76	10	117	3.85	158	1.63
36	30.76	77	10	118	3.77	159	1.6



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# **Packaged Heat Pump**

## **Service Manual**

The design and specifications of this product and/or manual are subject to change without prior notice.  
Consult with the sales agency or manufacturer for details.